FINAL REPORT – PLANT 4 AREA FORMER CERRO METAL PRODUCTS BELLEFONTE FACILITY SPRING TOWNSHIP, CENTRE COUNTY, PENNSYLVANIA PADEP FACILITY ID #14-17981

March 2012

Prepared for:

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March 7, 2012

Ms. Cheryl Sinclair, P.G.
Pennsylvania Department of Environmental Protection
Environmental Cleanup Program
208 West Third Street, Suite 101
Williamsport, PA 17701

RE: Final Report – Plant 4 Area
Former Cerro Metal Products Bellefonte Facility
Spring Township, Centre County, Pennsylvania
PADEP Facility ID #14-17981
Permitted Facility ID #722133 and Remedial ID #39039

Dear Ms. Sinclair:

Letterle & Associates, LLC is pleased to submit the Final Report for the remediation of soil and groundwater beneath the Plant 4 portion of the former Cerro Metal Products facility located in Bellefonte, Pennsylvania for your review and comment. The Final Report contains a brief summary of the project, a brief description of the regulatory structure, a conceptual site model, a brief summary of interim remedial activities completed in the Plant 4 area, a description of the technology, methods, and procedures to be utilized for remediation, the latest groundwater quality data, and a demonstration that the selected standard has been attained.

Sincerely,

Matthew C. Whitman, CHMM

Project Manager

Steven J. Treschow, P.G., CPG

Lu S Trulin

Professional Geologist

Enclosure

cc: Mr. Ray Avendt, Ph.D., P.E., The Marmon Group

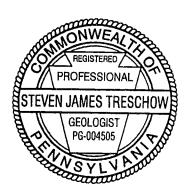
Ms. Marcy Eckley, Bolton Metal Products

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PROFESSIONAL GEOLOGIST CERTIFICATION

I, Steven James Treschow, a Registered Professional Geologist licensed in the Commonwealth of Pennsylvania (PG004505), have participated in the preparation of the document titled, "Final Report – Plant 4 Area, Former Cerro Metal Products Bellefonte Facility, Spring Township, Centre County, Pennsylvania, PADEP Facility ID#14-17981" I certify that the geologic and hydrogeologic content of this document, as prepared by the signing licensed Professional Geologist, are consistent with the applicable geologic and hydrogeologic standards of the Technical Guidance Manual for Pennsylvania's Land Recycling Program and Act 2.



Steven James Treschow, Professional Geologist

(Original Document bears Crimp Seal, Stamp, and Signature)

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1.0 SUMMARY AND REGULATORY STRUCTURE

The Marmon Group, a Berkshire Hathaway Company (Marmon), previously owned the stock of Cerro Metals, before selling the stock to Bolton MKM Corporation (Bolton). As part of the sale's agreement, Marmon retained the environmental liability for the site. Marmon initially contracted Chambers Environmental Group, Inc. (Chambers) to assist in the process of obtaining an Act 2 Relief of Liability for the site using Pennsylvania Department of Environmental Protection's (PADEP) Site Specific Standard (SSS). As of September 30, 2011, Letterle & Associates, LLC (Letterle) has acquired the operations and assets of Chambers. On October 1, 2011, Letterle resumed business operations at the former Chambers location in Bellefonte, Pennsylvania (PA). Letterle has informed the client of the change in company ownership and the client has retained the services of Letterle. The field services completed up to September 30, 2011 were completed by Chambers personnel and the reporting was completed by Letterle staff. For the remainder of this project, Letterle will be subcontracting EarthSystems, LLC (EarthSystems) to complete the required field work. The former Chambers' project management personnel were retained by Letterle in an effort to minimize interruptions to client service and regulatory communication.

The Cerro site consists of approximately 150 acres, 19 of which the plant occupies. The Cerro property is depicted on **Figure 1** of **Appendix A**. The site characterization was conducted in multiple phases in order to define specific areas for remediation. As part of the characterization process, Marmon submitted revised Notice Of Intent to Remediate (NIR) documents in July of 2009 to address specific sites as defined in PA Code, Title 25, Chapter §250.1. The characterization resulted in the identification of six distinct areas: the North Yard, Plant 1, South Spring, Plant 4, South Yard, and the Eastern Hillside (**Figure 2** of **Appendix A**). Each of the six areas was characterized and the results of the investigation are summarized in Volume I of II of the March 31, 2010 Remedial Investigation Report (RIR) (Chambers, 2010). The characterization revealed soils and groundwater beneath the Plant 4 area were impacted with volatile organic compounds (VOCs), metals, and Polychlorinated Biphenyl (PCB) Aroclor 1248. The PADEP approved the RIR in correspondence dated July 2, 2010. The PADEP assigned the Plant 4 area Permitted Facility ID #722133 and Remedial ID #39039.

The site characterization has been conducted in phases over the past 17 years. Historically, a Consent Order and Agreement (COA) was issued by the Pennsylvania Department of Environmental Resources (PADER, now PADEP) on November 21, 1994 to address various issues regarding the characterization and remediation of certain areas of the Cerro plant. The PADER required Cerro to address environmental and health and safety issues within and around the plant. These issues are summarized below along with the date that the issue was addressed by either Cerro or their consultant.

Table 1 COA Requirements

COA Issue		Date Completed	Notes
Immediate Response Measures	Sediments and sludge removed at outfall samples SED 40 and 44	July 29, 1994	
	Address baghouse dust	June 21, 2005	Air permit was modified
	Remediate metals and PCBs in existing soils, slag, sediment, dust and metal fines	February 14, 1994	Letter detailing analytical results of Plant 4 baghouse Currently ongoing through Act 2 process
	Plug Unused Drains and prevent drains' discharge to Logan Branch	2007 through 2008	Drains are identified and subsequently abandoned
	Pave previously unpaved areas	1994	All areas of plant have been paved by this date
	Stabilize stream banks	March 29, 1995	
Current Health Screening Documents	Submit all documentation for past five years	December 2, 1994	
Remediation Reporting	Submit report detailing remediation for past seven years	October 1, 1994	
Fish Tissue & Stream Sediment Monitoring	Submit biennial fish tissue samples for total PCBs, Pb, Cu, and Zn	October 31, 1994	December 2000, PADEP concluded not necessary to analyze fish tissue from Logan Branch
	Sample Logan Branch sediment for PCBs, Pb, Cu, Zn	October 10, 1995	
Response Work Qualifications	Retain qualified consultants	Multiple consultants have been hired to complete work at the plant	Geraghty & Miller and Mountain Research were retained
Work Plan Submittal to PADEP	Work plan must be Approved by PADEP to address COA	October 1, 1995	
Additional Assessment Activities	Surface water seeps to be tested	March 31, 1996	
	Sediment Study and Spring Creek Assessment	March 31, 1996	
	Streambank assessment	March 1, 1995 and March 31, 1996	
	Airborne Particles – Assess air dispersion and Pb, Cu, Zn contamination	June 2, 1997	Summary of soil quality conditions of hillsides
Detailed Site Plan	Site Characterization Work Plan	October 19, 1994	Volumes I, II, III submitted by Geraghty & Miller
Site Remediation Plan	Site Remediation Plan	February 2, 1995	Habitat improvement has been completed under supervision of Mark Hartle PA Fish & Boat Commission
	Groundwater contamination	Currently under Act 2 process	
	Soil contamination	Currently under Act 2 process	
	Logan Branch fine stream sediments remediation	February 17, 1995	Great Lakes Environmental Services completed this work
	Stormwater permits	Currently in place	
Water Supply	Cerro shall report on all public and private supply wells within 2,500 feet of the site	January 17, 1995	Completed by Geraghty & Miller

There are other requirements within the COA. However, these issues largely pertain to permit requirements, reporting requirements, civil penalties, stipulated penalties,



oversight costs, and transfer of the site. These issues are not pertinent to this report. There are no outstanding issues regarding the COA and due to the initiation of the Act 2 Land Recycling Program, the COA has been superseded. Groundwater and soil contamination is being addressed through the characterization and remediation currently taking place.

In accordance with PA Code, Title 25, Chapter § 250.410, a Cleanup Plan must be prepared when the SSS is a potential remedial goal. Chambers prepared and submitted a Cleanup Plan for the Plant 4 area which indicated SSS was likely the remedial goal for the site, but SHS would also be evaluated. The Cleanup Plan was approved by the PADEP in correspondence dated February 22, 2011. The Cleanup Plan was implemented immediately upon approval. In accordance with § 250.411, a Final Report must be prepared for any site remediated under the SSS which documents attainment of the selected standard. Specifically, Chapter § 250.411 specifies a Final Report shall include a summary of the site characterization which includes, but is not limited to, the following: historic use of the property, historic usage of regulated substances, source characterization, development of a conceptual site model, delineation of the horizontal and vertical extent of contamination, fate and transport analysis of constituents-of-interest (COI), descriptions of sampling and decontamination methodologies and analytical quality assurance/quality control procedures, soil boring/monitoring well logs, laboratory analytical data, determination of the physical and geochemical properties of the media of concern (including sampling data, descriptions, and methodology), evaluation of ecological/sensitive receptors, and a formal demonstration of attainment for the selected standard. This Final Report summarizes the results of the approved Cleanup Plan along with demonstrating attainment of SSS for the Plant 4 area.

2.0 SITE CHARACTERIZATION

2.1 Historic Property & Regulated Substance Use Summary

Historic operations at Cerro have included forging, machining, melting, casting, pickling, drawing, and the finishing of metals, specifically copper and brass. Cerro historically handled and stored various lubricants, oils, degreasers, sulfuric acid and hydrogen peroxide for operations conducted on site. The manufacturing operations flowed in a southern to northern direction through the site buildings. Raw and scrap metals, which have included copper, zinc, lead, brass, and other alloying metals, were delivered to the South Yard before being deposited into Plant 4 where they were housed in the southern most section of Plant 4 to prevent contact with precipitation. The raw and scrap metals were melted in Plant 4 and turned into ingots. The ingots were extruded into various shapes and lengths within the middle section to northern section of Plant 4. The most northern section of Plant 4 consisted of areas to forge and finish the brass as well as storing the finished products. The northwestern section of Plant 4 was the shipping area for the finished product. Figures 3 and 4 of Appendix A depict the Plant 4 portion of the property in more detail.

2.2 Historic Investigation Summary

Historic investigation activities in the Plant 4 area were based upon the previous use of that portion of the property. The historic investigative activities completed in the Plant 4 area were completed from 1993 through 1996. The investigative activities consisted of stream sampling, wipe sampling (for PCBs), groundwater well installation/sampling, soil boring advancement/sampling, and a stream survey. The investigative activities focused on the identification and characterization of PCB Aroclors 1242, 1221, 1232, 1248, 1254, and 1260, total and dissolved copper, total and dissolved lead, total and dissolved zinc, aluminum, arsenic, chromium, iron, Total Petroleum Hydrocarbons (TPH), silver, nickel, selenium, cadmium, benzene, toluene, ethylbenzene, and total xylenes. The characterization activities conducted by Chambers focused on the constituents identified above applicable standards during historic investigations.

2.3 Methods and Procedures

The following subsections detail the methods and procedures utilized by Chambers to complete the site characterization investigative activities at the site. The results of the investigative activities are presented following the discussion of the methods and procedures utilized throughout the investigation. The site characterization activities were performed in accordance with the general site characterization requirements outlined in Act 2 (25 PA Code Chapter 250, Subchapter C) and the Pennsylvania Land Recycling Program Technical Guidance Manual (TGM) (PADEP, 2002). The methodologies presented in the following subsections reflect standard operating procedures for

Chambers and are consistent with general and accepted industry practices. Chambers could not verify if the methods and procedures described in the following section were utilized by other entities that completed historic site characterization activities.

All work performed by Chambers was in compliance with the *Chambers' Health and Safety Plan* (HASP). Addendums to the Chambers HASP were prepared in order to address site-specific health and safety issues, including identification of COI, emergency contact information, emergency response services, and location and directions to the nearest medical facility.

2.3.1 Soil Boring, Logging, and Field Screening

Soil borings were advanced onsite by direct-push (Geoprobe®) boring and a hollow-stem auger drill rig using split spoon sampling by Bassett Environmental Associates Inc. (BEA), who was a licensed PA drilling firm. The direct-push method utilizes a 2-inch outside diameter (OD) and 1.5-inch inside diameter (ID) by 4 or 5-foot long hollow sample barrel (depending upon the exact model Geoprobe). Each barrel (with disposable acetate interior liner) was driven into the subsurface by means of a hydraulic ram/hammer. After driving the sampler to the desired interval, the sample barrel was retrieved from the borehole and the acetate liner removed. The soil-filled liner was then cut open and logged by the supervising field personnel. Samples designated for analyses or field screening were collected from the liner and placed in appropriate sample/screening containers. Borings and/or split spoons were advanced to refusal within the overburden materials. Hollow-stem auger drilling and split spoon soil sampling was completed in accordance with American Society of Testing & Materials (ASTM) D-1586 (Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils).

Logging of each soil boring was performed by the supervising field personnel and included descriptions of the physical characteristics of the soil (e.g., color and texture), classification according to the United States Department of Agriculture (USDA) or the Unified Soil Classification System (USCS), visual and olfactory observations of the presence/absence of petroleum related compounds, field screening results, and observations of the occurrence of saturated conditions/groundwater. Logging results are included on the soil boring logs included as **Appendix B**.

Field screening of soil samples was completed for soil borings to provide qualitative data for vertical delineation, and to facilitate selection of the subsurface soil intervals exhibiting potential impacts from site-related constituents. The field screening method utilized a photo ionization detector (PID) equipped with an 11.7 electron-volt (eV) lamp. Soil samples for field screening were prepared by crushing a representative sample from each 2-foot depth interval into a re-sealable, plastic freezer bag (Ziploc®) or similar container. The bag was then closed and sealed while maintaining an air void within the

bag. The filled and sealed bag was then set aside to equilibrate and permit volatilization of constituents into the bag's headspace. At the end of the equilibration period, the tip of the PID probe was inserted into the plastic bag and the total volatile organic head-space concentration was measured and recorded. The results of the field screening are presented on the soil boring logs included as **Appendix B**.

Collection of soil samples for laboratory analyses was performed at various locations across the site. In general, samples were collected at 0-6 inches below ground surface (inbgs) below the asphalt/concrete/soil surface, at 120-126 in-bgs, at the groundwater interface, and just above auger or Geoprobe® refusal/bedrock. Soil samples were also collected based upon visual observations, olfactory observations, and/or PID measurements.

Soil samples were collected from the disposable sampling device (acetate liner from the direct-push sample barrel or split spoon) and placed directly into the laboratory-supplied sample containers. A sample aliquot was collected from the sampling device by means of a dedicated and disposable syringe; approximately three, 5-gram samples were collected from the soil interval and then dispensed into one methanol-preserved 40-ml vial and two sodium bisulfate preserved 40-ml vials. Additional soils representative of the sample interval were removed from the sampling device and packed into an unpreserved 40-ml vial or 4-ounce jar for analysis of percent moisture to enable a dry-weight conversion of the analytical results.

All soil samples were submitted to American Westech (Westech), of Harrisburg, PA for analysis. The soil samples were analyzed for VOCs, SVOCs, TPH, PCBs, and metals or some combination if the soil sample was biased, via United States Environmental Protection Agency (USEPA) Methods SW846 8260B, SW846 8270C, SW846 8015 DRO, SW846 8082, and SW846 6010B or 7471A, respectively, and were accompanied by Chain-of-Custody (COC) documentation. Quality assurance/quality control (QA/QC) measures utilized during soil sample collection are discussed in Section 2.3.5 of this report.

Sealing and abandonment of all exploratory borings was completed following soil sample collection. Boreholes were sealed with bentonite chips/pellets placed within the open borehole to the approximate ground level. The bentonite chips/pellets were hydrated with potable water to ensure a proper seal. Each boring was subsequently surveyed to provide a record of its location and elevation.

2.3.2 Groundwater Monitoring Well Installation

Drilling and installation of monitoring wells in the Plant 4 area was completed by BEA and Eichelbergers, Inc. using nominal 8 ¼ -inch hollow stem auger drilling, 6-inch air rotary drilling, and/or 3-inch NWQ wireline rock coring and standard well construction methods. Shallow boreholes were advanced to auger refusal and completed based upon

the depth of the weathered/competent bedrock interface observed at the time of drilling. Bedrock boreholes were advanced into saturated conditions and completed based upon observations made in regards to the presence of groundwater in bedrock at the time of drilling.

Soil and bedrock cuttings were examined for visual and olfactory observations of the presence/absence of VOCs. Observations of the occurrence of groundwater were made as drilling progressed. The cuttings were stockpiled on site for characterization and disposal at a later time.

Monitoring well construction was completed in accordance with PADEP's "Ground Water Monitoring Guidance Manual" (Guidance Manual). A 2-inch inside-diameter (I.D.) and/or 4-inch ID polyvinyl chloride (PVC) monitoring/recovery wells, and one 10-inch ID stainless steel recovery well consisting of a slotted screen interval and a solid riser, was constructed within the borehole for each well. A clean quartz sand pack was placed in the annular space surrounding the well screen to a level approximately 2 feet above the top of the screened interval. A minimum 2-foot thick bentonite seal consisting of 3/8-inch bentonite pellets was placed over the sand-pack and hydrated with potable water to ensure an adequate seal. Surface finishing of each new well included a bolt-down, flush-mount manhole set within a concrete pad. Bedrock groundwater monitoring wells were sealed at or below the overburden/bedrock interface to prevent vertical communication between the two aquifers.

Logs detailing the installation and construction of each groundwater monitoring well are provided in **Appendix B**. Groundwater monitoring well logs were prepared under the supervision of a Professional Geologist licensed in the Commonwealth of Pennsylvania.

Development of each monitoring well was completed using a combination of pumping and surging. The pumping and surging method utilized a decontaminated submersible electric pump with disposable high-density polyethylene (HDPE) tubing. The wells were surged by rapidly raising and lowering the pump across the saturated screened interval of the well during pumping.

Water level and total depth measurements were recorded in each well prior to development to determine the volume of water present within the well (well volume). Personnel performing the activity periodically evaluated the progress of development through a qualitative assessment of the apparent groundwater quality (i.e., quantity and nature of removed sediments and water clarity). Development activities were deemed to be complete based on the following: a minimum of five well volumes were removed; turbidity and suspended solids decreased; and sediments from the bottom of the well casing were removed.

Each groundwater monitoring well was subsequently surveyed to provide a record of its horizontal location, adjacent ground surface elevation (top of flush mount well cover and



natural ground surface), and to establish a reference elevation (e.g., top of PVC well casing) from which to collect depth-to-groundwater measurements (to be converted to groundwater elevations). The survey of the site was completed by a professional land surveyor licensed in the Commonwealth of Pennsylvania. Surveying activities are described in detail in Section 2.3.4.

2.3.3 Groundwater Monitoring and Sampling

Groundwater monitoring activities completed during the site characterization included fluid-level monitoring and groundwater sampling. Fluid-level monitoring included the identification, determination, and measurement of the water level and separate phase liquid (SPL) (if present) within groundwater monitoring wells. Fluid-level monitoring was performed during groundwater sampling events in site monitoring wells with an electronic-level indicator capable of detecting and discriminating between water and non-aqueous phase liquids (NAPLs). The device provided both an audible and visual indication of the presence of liquids and depths-to-liquids were determined from the graduated markings on the line connecting the probe in the well with the device at the surface.

Fluid-level measurements were performed by slowly lowering the interface probe into the monitoring well until the alarm (visual and/or audible) indicated the presence of the uppermost fluid level (either water or SPL). The precise measurement of the depth to the top of the fluid was then determined by repeatedly raising and lowering the tape to converge on the exact measurement (to hundredths of a foot) then reading the depth of the probe (from the graduated markings on the line) as feet below the well's surveyed reference point. The reference point is marked on the top of each well's PVC casing. The probe indicated what type of fluid the probe was contacting by emitting differing audible tones. Once the upper fluid level was measured, the probe was lowered to the bottom of the well to determine the total depth of the well and to determine if dense non-aqueous phase liquid (DNAPL) was present. Fluid-level measurements were recorded in the field notebook.

The monitoring and sampling activities also included the collection and analysis of groundwater samples. Sampling of the site monitoring well network was performed in accordance with the PADEP's Groundwater Monitoring Guidance Manual and generally accepted industry practices and the USEPA Region 3 Low-Flow Sampling Procedure. In general, groundwater sampling utilized the following procedures:

- The wells were sampled from least contaminated to most contaminated (if known) in order to further minimize potential cross-contamination.
- Subsequent to initiating groundwater sampling, a complete round of fluid-level measurements was completed in all wells. However, the thickness of DNAPL

was only gauged after the sampling was complete in order to avoid smearing the DNAPL through the water column.

- A submersible pump with new dedicated polyethylene tubing was slowly lowered into the well and positioned so the pump intake was within the screened interval of the well.
- The well was purged at 100-500 milliliters per minute (mL/min) and the purge rate was adjusted so no more than 0.33 feet of drawdown was observed. A water level meter was left in the well during purging to continuously monitor drawdown.
- The extracted groundwater was monitored for specific conductivity, dissolved oxygen (DO), turbidity, oxidation-reduction potential (ORP), pH, and temperature. A multi-parameter flow-through cell was utilized to monitor a majority of the parameters with the exception of turbidity. Turbidity measurements were taken separately. Water quality parameters were monitored and recorded every 3 to 5 minutes. Specific conductivity, pH, ORP, turbidity, and DO were allowed to stabilize prior to sampling. Ideally, specific conductivity should have been +/- 3 microsiemens per centimeters (μs/cm), pH +/- 0.1 pH units, ORP +/- 10 millivolts, turbidity +/- 10 % NTUs, and DO +/- 3 milligrams per liter (mg/L).
- The discharge line from the flow-through cell was placed into a bucket or other container. Flow measurements and water levels were taken every 3 to 5 minutes.
- A minimum of one tubing volume was purged from each well prior to ending the purge. Once one tubing volume was purged and the parameters stabilized per the above criteria, sampling was completed. Prior to sample collection, the purge rate was reduced to approximately 100 mL/min.
- Prior to sampling, the tubing was disconnected from the flow-through cell so the sample was collected directly from the pump discharge. If field filtering samples, the filter was connected to the discharge tubing and 0.5 to 1 liter of water was allowed to pass through the filter prior to sampling.
- The sample was collected directly from the discharge tubing and decanted directly from the discharge tubing into the laboratory-supplied glassware.
- The groundwater samples were sealed in pre-preserved laboratory supplied glassware, labeled, custody sealed, placed in an ice-filled cooler, and returned to Chambers' office. The samples were stored in a refrigerator (at 4 °C) until they were collected by the analytical laboratory. The samples were submitted to Westech of Harrisburg, PA or Fairway Laboratories, of Altoona, PA for analysis. The samples were analyzed for VOCs, SVOCs, PCBs, TPH, and metals via USEPA Methods SW846 8260B, SW846 8270C, SW846 8015 DRO, SW846 8082, and SW846 6010B or 7471A, respectively, and were accompanied by COC documentation. QA/QC measures utilized during groundwater sample collection are discussed in Section 2.3.5 of this report.
- Quarterly groundwater samples were accompanied by COC documentation.

• The purge water was containerized and characterized for disposal.

Each of the quarterly groundwater sampling events included the analysis of one trip blank sample (which accompanied the samples from collection to laboratory receipt) and one duplicate sample. Both the trip blank and duplicate samples were analyzed for of PCB Aroclor 1248 via USEPA Method 8260B. The results of the quarterly reporting were summarized in quarterly reports which were submitted to the PADEP. Quarterly reports will be submitted for the duration of the proposed post-remedial monitoring.

Lastly, the soil samples collected and submitted for Synthetic Precipitation Leaching Procedure (SPLP) analysis were evaluated to determine if they met SHS. The results of the evaluation are presented in a Section 6.3 of this Final Report.

2.3.4 Surveying

A boundary and site survey of the property and area of investigation was completed by Land & Mapping Services, Inc. of Clearfield, PA, ELA Group, Inc., and Kerry Uhler & Associates, Inc. of Bellefonte, PA. The survey included a full boundary retracement to establish property boundaries, as well as the location of buildings, structures, edges of pavement/cartway, underground utility lines (those marked out by PA One Call), overhead utility lines, monitoring well locations (ground surface, top of manhole cover, and top of PVC riser at each location), adjacent stream location (Logan Branch), and the Pennsylvania Department of Transportation (PADOT) right-of-way location. Horizontal locations are in the PA State Plane coordinate system and elevations are in feet above mean sea level (ft-amsl) and referenced to the North American Datum of 1983 (NAD 83). The survey was completed by a registered Professional Land Surveyor licensed in the Commonwealth of Pennsylvania.

2.3.5 Quality Assurance/Quality Control

QA/QC samples collected during the field investigation activities performed by Chambers included trip blanks and duplicate samples.

Trip blank samples were obtained from the laboratory and were submitted with groundwater and soil samples for analyses of site COI. The trip blank samples were used to determine potential exposure of the samples to ambient contamination that could compromise the integrity and validity of the samples. The trip blank samples are maintained with the primary samples from bottle preparation at the laboratory, to the field for use, and returned to the laboratory for analysis. The trip blank sample may also be used to determine the presence of laboratory contaminants at the time of analysis.

Duplicate soil and groundwater samples were collected throughout the site characterization. Duplicate groundwater samples are collected by simultaneously filling two sets of sample bottles from one sample location. Duplicate soil samples were taken by filling two sets of sample bottles from one sampling location/depth. Duplicate

samples were given fictitious identifications and submitted to the laboratory as "blind" samples. These duplicate samples provide a quantifiable measurement as to the degree of the laboratory's ability to reproduce a given result, and the reproducibility of the sampler and sampling method.

2.3.6 Sample Management

Samples collected for laboratory analysis were handled and managed in accordance with standard COC procedures and generally-accepted industry practices. COC forms were completed for samples submitted for laboratory analysis. The COC form included, at a minimum, the following information:

- Site identification (site name).
- Site contact person and phone number.
- Sampler(s) name.
- Sample location, identification, time, and date.
- Analyses requested.
- Number of samples.
- Special instructions to the laboratory.

The completed COC form accompanied soil and groundwater samples from collection to receipt at the laboratory and documents all handling of the samples. Copies of the COCs for the soil and groundwater investigation are included with the corresponding analytical reports in **Appendix C**.

Immediately following their collection, samples were placed in a durable cooler with ice pending pick-up by laboratory or overnight shipment to the lab. Each sample container was labeled with the following minimum information:

- Site identification.
- Sample identification, time, and date.
- Preservative (if any).
- Sampler's initials.
- Analyses to be performed.

Samples were sealed within a water-tight plastic bag (e.g., Ziploc®) and ice was placed in the coolers to maintain acceptable sample temperatures during transport to the laboratory.

2.3.7 Decontamination

Dedicated equipment and materials were used where applicable and appropriate throughout the investigation. Non-dedicated and/or non-disposable equipment used for soil boring and sampling, groundwater monitoring well installation, and development and sampling were decontaminated prior to and/or after use and exposure to site soils and groundwater. The procedures of equipment decontamination varied according to the type of equipment, equipment use, and data objectives of the particular phase of the investigation. All procedures maintained the same overall objective of minimizing the potential for cross-contaminating samples and media during the implementation of investigative activities. The following section describes the typical decontamination procedures for the various investigative tasks.

Soil boring and sampling equipment that came into contact with subsurface soils and groundwater were decontaminated to varying degrees depending on the type of equipment, the data objectives, and the location of the soil boring. The general decontamination procedure for excavation and sampling equipment, general heavy equipment (drill rigs, etc.), and miscellaneous hand tools (shovels, wrenches, etc.) included the following:

- Initial pressurized water wash.
- Follow-up detergent wash (if necessary).
- Multiple water rinses (to remove detergent).
- Additional pressurized water wash (if necessary).

Decontamination of the submersible pumps used for well development and sampling included a wash with detergent (e.g., LiquinoxTM or AlconoxTM) and water solution, followed by multiple water rinses. Internal workings of the pumps were decontaminated by running the pump in the detergent/water cleaning and water rinse solutions. Pumps were then inverted to allow excess liquid to drain from the pump. Decontamination of fluid-level monitoring probes included a wipe with a clean rag/paper towel to remove adhered substance or debris, followed by a detergent or solvent rinse, and multiple rinses with deionized water.

2.3.8 Project Documentation

Field activities and observations were recorded on one or more of the following:

- Project Field Notebook.
- Photographs.
- Sampling COCs.

The project field notebook was used to record a chronological history of site activities, including: site identification, Chambers project number, field dates, weather conditions, personnel and equipment used, measurements, and notes of any observations made while on-site.

Photographs of various activities were taken to provide a visual archive of site investigative and monitoring activities. These photos supplement field notes and are maintained in the project files for future reference.

2.3.9 Investigation-Derived Wastes

Investigation-Derived Waste (IDW) material generated through the completion of the site characterization and monitoring activities included the following:

- Decontamination fluids.
- Fluids from monitoring well development, purging, and sampling.
- Soil and rock cuttings from drilling activities.
- Personal protective equipment (PPE).
- Acetate liners utilized for soil sampling.
- Plastic tubing.
- Packing materials.

PPE, acetate liners, plastic sheeting, tubing, and packing materials were disposed through the local residual waste management system. Decontamination fluids and groundwater generated by groundwater well development, purging, and sampling were either discharged to the ground surface on-site following treatment through a portable, 10-gallon GAC unit or containerized and shipped off site for treatment and disposal. Drill cuttings were screened with a PID, segregated based upon the PID screening, and stockpiled on plastic (if impacts were observed) pending disposal.

2.3.10 Quality Assurance Plan

A Quality Assurance Project Plan (QAPP) was completed as part of the Remedial Investigation which outlined the areas and constituents to be sampled for and at what locations. The QAPP is included in **Appendix D**. The QAPP provides additional information concerning the QA/QC procedures utilized throughout the completion of the site characterization.

2.4 Overall Site Characterization Approach

Each of the six areas of the site was investigated by using a multitude of resources. Historical drawings, employee interviews, soil sampling, groundwater sampling, surveying, and groundwater modeling were used to characterize the study areas. Ninety-four unbiased soil borings and 26 biased soil borings were advanced in the investigated areas. Unbiased soil borings were placed within a 100-foot by 100-foot grid over the plant, while the biased soil borings were placed in specific locations due to known historical activities. The unbiased soil boring soil samples were analyzed for VOCs, SVOCs, TPH, PCBs, and metals in at least three different subsurface elevations; below

surface in the unsaturated zone, at or above the water table (at the time of sample collection), and directly above the bedrock. Biased soil samples were analyzed specifically for the known constituents thought to have been present at one time or historically utilized as part of site operations in the specific area of the sample.

Soil sample locations that reportedly contained constituent concentrations above their respective PADEP UANRSHS MSC were also selected for groundwater monitoring well locations in order to determine if groundwater had been impacted by COI. Groundwater characterization began by installing bedrock wells, screened entirely within the bedrock with a seal between the bedrock and overburden to prevent communication between aquifers. These wells were then sampled to determine if the groundwater within the specific area needed further characterization. A working total of 34 monitoring wells were installed throughout the Plant 4 area.

In summary, site characterization activities included soil borings, soil sampling and analysis, groundwater monitoring well installation, groundwater monitoring, sampling, and analysis, stormwater/drainage evaluations, sediment sampling/analysis, and surface water monitoring.

2.5 Plant 4 Soil Characterization

The field work for the characterization of Plant 4 was initiated on July 21, 2007. A total of thirty-three unbiased soil borings, SB-57U through SB-89U; and five biased soil borings, SB-22B through SB-26B, were advanced in Plant 4.

Both biased and unbiased soil borings were logged and sampled in at least three subsurface depth intervals. Samples were collected below asphalt/concrete/soil surface, at groundwater occurrence (60-120 in-bgs), and just above auger or Geoprobe® refusal/bedrock. Table 2 lists the biased boring, the past historical operation, and the analysis performed on the soil sample.

Table 2
Plant 4 Biased Soil Samples and Analyses

Boring ID	Location	Historical Operation	Analyses
SB-22B	Oils Storage Area	AST Oil Storage	TPH
SB-23B	Oils Storage Area	Hydraulic Oil Storage	ТРН
SB-24B	Oils Storage Area	Hydraulic Oil for Billet Heaters	ТРН
SB-25B	Oils Storage Area	Hydraulic Oil for Billet Heaters	TPH
SB-26B	Oils Storage Area	Raw Material Storage Area	TPH

In all, 92 VOC, 93 metals, and 78 PCB soil samples (includes both biased and unbiased samples) were collected and analyzed in Plant 4. Soil boring locations are identified in **Figures 5** and **6**. Table 3 identifies soil samples where the respective PADEP UANRSHS MSCs were exceeded. Depending on the saturated or unsaturated status of

the sample, samples were compared to the respective saturated or unsaturated PADEP UANRSHS MSC.

Table 3
Summary of Exceedances in Plant 4 Soil Samples

TCE
(Unsaturated UANRSHS – 0.5 mg/kg; Saturated UANRSHS – 0.5 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-58U 12-18"	0.794
SB-61U 6-18"	16.4
SB-71U 0-2'	0.668
SB-84U 12-18"	0.887

Note: VOCs – all units in milligrams per kilogram (mg/kg).

Naphthalene (Unsaturated 0-2' UANRSHS – 10 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-70U 0-2'	17.6

Note: VOCs - all units in mg/kg.

1,2,4-Trimethylbenzene (Unsaturated 0-2' UANRSHS – 20 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-70U-0-2'	40.4

Note: VOCs - all units in mg/kg.

1,3,5-Trimethylbenzene (Unsaturated 0-2' UANRSHS – 6.5 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-70U-0-2'	17.1

Note: VOCs – all units in mg/kg.

There were no separate soil samples analyzed for SVOCs given the characteristics of chemicals used.

Arsenic (Unsaturated UANRSHS – 53 mg/kg – 0-2'/150 mg/kg – 2-15') Saturated UANRSHS – 15 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	•
SB-58U 300-321"	21.8
SB-62U 262-264"	15.6
SB-87U 252-279"	24.3
SB-88U 324-332"	16.4

Note: Metals - all units in mg/kg.



Chromium (total)

(Unsaturated UANRSHS – 420 mg/kg – 0-2'/190 mg/kg-2-15') Saturated UANRSHS – 19 mg/kg) – Chromium VI standard used for comparison

Soil Sample ID	Concentration
Unbiased Samples	
SB-58U-158-180"	34.6
SB-59U 252-264"	25.5
SB-61U 60-84"	139
SB-76U 246-258"	19.2

Note: Metals - all units in mg/kg.

Lead (Unsaturated UANRSHS – 450 mg/kg; Saturated UANRSHS – 45 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-57U-336-360'	110
SB-61U-60"-84"	305
SB-76U-246-258"	55.4
SB-89U-120-148"	104
Biased Samples	
SB-25B-210-222"	50.4

Note: Metals - all units in mg/kg.

Mercury (Unsaturated UANRSHS – 10 mg/kg; Saturated UANRSHS – 1 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-69U-0-2'	7,400
SB-70U-0-2'	856
SB-71U-0-2'	1,980

Note: Metals - all units in mg/kg.

Silver (Unsaturated UANRSHS – 10 mg/kg; Saturated UANRSHS – 1 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-69U-0-2'	232
SB-71U-0-2'	126
SB-74U-12-18"	10.3

Note: Metals - all units in mg/kg.

Selenium

(Unsaturated UANRSHS – 26 mg/kg; Saturated UANRSHS – 5 mg/kg)

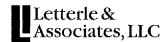
Soil Sample ID	Concentration
Unbiased Samples	
SB-74U-318-324"	11.7

Note: Metals - all units in mg/kg.

Zinc (Unsaturated UANRSHS – 12,000 mg/kg; Saturated UANRSHS – 1,200 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-61U-60-84"	21,200
SB-89U-120-148"	1,830

Note: Metals - all units in mg/kg.



Aroclor 1248 (Unsaturated UANRSHS – 67 mg/kg; Saturated UANRSHS – 6.7 mg/kg)

Soil Sample ID	Concentration
Unbiased Samples	
SB-86U-36-60"	9.18

Note: PCBs - all units in mg/kg.

As indicated in the Table 3, TCE, naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-trimethylbenzene (TMB) soil contamination was encountered in Plant 4. There were seven soil samples (five soil boring locations) exceeding the PADEP UANRSHS MSC for these constituents. The concentrations of TCE, naphthalene, 1, 2, 4-TMB, and 1, 3, 5-TMB do not appear to be extensive and wide spread nor does there seem to be one particular AOC. There were no separate soil samples analyzed for SVOCs given the characteristics of chemicals used.

Arsenic, chromium (total), lead, selenium, mercury, silver, and zinc were also identified above their respective PADEP UANRSHS MSC. Arsenic is not associated with past or present operations at the facility. Given the low levels present and the homogeneous distribution across the site, the detected arsenic concentrations are within the typical range of naturally occurring local soils. The arsenic was also found in the saturated soil, which has a lower PADEP UANRSHS MSC. Chromium was analyzed for total chromium, not trivalent or hexavalent chromium. The more conservative hexavalent chromium standard was used in comparison with the total chromium results. Based on the comparison, there were potentially four soil samples that exceeded the hexavalent chromium standard. Lead was identified above its PADEP UANRSHS MSC in five soil samples, mercury and silver in three soil samples, selenium in two soil samples, and zinc in two soil samples.

Finally, only one sample was identified as being above the PCB Aroclor 1248 PADEP UANRSHS MSC. This sample was also in the saturated zone.

2.6 Plant 4 Groundwater Characterization

Thirty two groundwater monitoring wells and three recovery wells were installed in the Plant 4 vicinity in order to characterize and remediate groundwater. The monitoring wells were located in areas where the soil samples reportedly contained elevated concentrations of COI, areas where former equipment was located, areas downgradient of the former equipment, and between the suspected source area and the likely receptor (Logan Branch). The overburden within Plant 4 ranged from five ft-bgs to 20 ft-bgs. Due to the limited thickness of overburden found in Plant 4, only eight overburden wells were installed.

The shallow and bedrock wells were labeled as follows:

SB-52U-S	SB-67U-D;	SB-79U-D
SB-52U-D	SB-68U-S	SB-79U-D1
<i>SB-56U-S</i>	SB-68U-D	SB-80U-D
<i>SB-56U-D</i>	SB-71U-S	SB-81U-D
<i>SB-57U-S</i>	SB-72U-D	SB-85U-D
SB-57U-I	SB-72U-S	SB-86U-D
<i>SB-57U-D</i>	SB-76U-D	SB-88U-D
SB-61U-D	SB-77U-D	SB-89U-D
SB-61U-S	SB-77U-D1	SB-89U-D1
SB-65U-D	SB-78U-D	RW-1
SB-66U-D	SB-78U-D1	RW-2
SB-66U-D	SB-78U-S	RW-3

Note: Wells in italicized font have been abandoned.

Groundwater samples from the monitoring wells were analyzed for VOCs, PCBs, and metals or a variation of these constituents depending on the location and suspected contaminant. Again, the data from the groundwater samples was analyzed to determine if constituent concentrations were above the PADEP UANRSHS MSCs and required further characterization. The groundwater analytical data for wells SB-66U-D, SB-67U-D, SB-77U-D, SB-78U-D, and SB-79U-D indicated the need for further characterization of the bedrock groundwater aquifer. These wells are located within the area that housed the furnaces Tama 1, Tama 2, Tama 3, Tama 4, and Ajax 7. The furnaces have been removed and the pits filled with gravel, while the casting pits have been filled with concrete. Groundwater monitoring wells SB-66-D1, SB-77U-D1, SB-78U-D1, SB-79UD-1, SB-80U-D, SB-88U-D, and SB-89U-D were added to address these exceedances and complete characterization of this area.

The South Spring is immediately to the north of Plant 4. The South Spring pond was dewatered and cleaned as part of the overall site remedial strategy. During the pond dewatering, an oil seep was encountered in the southeastern corner of the pond. The oil seep was believed to be from operations within Plant 4. The oil was contained and removed using absorbent pads, booms, and skimmer pumps. During the cleanup, oil did not migrate into the Branch as confirmed through a series of inspections by the PA Fish and Boat Commission. Due to the oil seep, further removal of the sediments in the pond ceased. The bottom and sides of the pond were lined with rip-rap material to prevent scouring of the sediments by the spring water. Once the water within the pond was allowed to return to static conditions, the oil seep stopped discharging into the pond water. Monitoring wells SB-52U-S, SB-52U-D, SB-56U-S, SB-56U-D, SB-57U-S, SB-57U-I, SB-57U-D, SB-68U-S, and SB-68U-D were installed in the northern section of Plant 4 in characterize the oil seep. The seep was not encountered and all well samples contained concentrations of COIs that were non-detect or below laboratory reporting

limits. Therefore, these wells were abandoned leaving twenty six monitoring wells in the network.

In order to facilitate potential removal of DNAPL in bedrock groundwater, three recovery wells (RW-1, RW-2, and RW-3) were installed. The recovery wells were placed in the central portion of the DNAPL plume and adjacent to Tamas #3 and #4. DNAPL did accumulate in recovery wells RW-1 and RW-2, but not at a thickness which warranted the installation of the total fluids pump. Recovery well RW-3 did not have any accumulation of the DNAPL. The DNAPL which accumulated in the recovery wells has been removed manually via a bailer. As with the rest of the Plant 4 wells, the DNAPL is slow to reaccumulate after a recovery event.

In order to evaluate the fate and transport of COI in groundwater, two additional bedrock groundwater monitoring wells (SB-89U-D and SB-89U-D1) were installed between Logan Branch and the former furnaces. The location of the existing monitoring wells can be seen in **Figures 3** and **4**. A September 13, 2011 Plant 4 Potentiometric Surface Contour is included as **Figure 7**, and PCB concentrations and wells with SPL present are identified on **Figure 8**. Boring/monitoring well logs for the wells installed in Plant 4 are presented in **Appendix B**.

In addition to the new wells being installed, the groundwater sampling protocol was altered to ensure the data collected was representative of dissolved-phase PCB concentrations. During the first two groundwater sampling events (December 2008 and March 2009) in Plant 4, the DNAPL was removed first, then the well was purged, and a sample was collected from approximately five feet above the DNAPL. The data obtained using this methodology is believed to be erroneous, and not thought to be representative of the dissolved-phase PCB concentrations in groundwater. A new sampling protocol was developed where the DNAPL was left in place, the pump placed at approximately five feet above the top of the DNAPL and the well was purged and sampled using the USEPA low flow method. After the sample was obtained, the DNAPL was removed from the well. An approximate order of magnitude reduction in dissolved phase PCB concentrations was observed in several of the wells in the third sampling event (May 2009). The USEPA low-flow sampling method is described in section 2.3.3 of this Final Report. Table 4 summarizes the exceedances observed in groundwater samples collected from monitoring wells in Plant 4 during the characterization process.

Table 4 Summary of Exceedances in Plant 4 Groundwater Samples

Arsenic (dissolved) (UANRSHS – 10 µg/l)

Monitoring Well Sample ID	Sample Date	Concentration
Plant 4 MW-1	November 11, 2007	10
SB-P4-1	November 9, 2007	17
SB-66U-D	December 3, 2008	17
SB-78U-D	November 21, 2008	11
SB-78U-D1	March 6, 2009	22

Note: Metals – all units in $\mu g/l$.

$Barium \ (dissolved) \\ (UANRSHS-2,000 \ \mu g/l)$

Monitoring Well Sample ID	Sample Date	Concentration
Plant 4 MW-1	November 11, 2007	2,720

Note: Metals – all units in $\mu g/l$.

Lead (dissolved) (UANRSHS – 5 μg/l)

Monitoring Well Sample ID	Sample Date	Concentration
MW-2	November 10, 2007	9
Plant 4 MW-1	March 6, 2009	55
SB-78U-S	November 21, 2008	9

Note: Metals - all units in $\mu g/l$.

Zinc (dissolved) (UANRSHS – 2,000 μg/l)

Monitoring Well Sample ID	Sample Date	Concentration
SB-79U-D	July 30, 2009	3,740
SB-79U-D	August 7, 2009	5,990

Note: Metals - all units in µg/l.

PCB Aroclor-1248 (UANRSHS – 1.4 μg/l)

Monitoring Well Sample ID	Sample Date	Concentration
MW-P4-1	November 11, 2007	58.5
MW-P4-1*	March 6, 2009	29.5
MW-1 (MW-P4-1)	May 27, 2009	6.74
MW-2	November 10, 2007	5.13
SB-P4-1	November 9, 2007	5,540
SB-P4-1	May 27, 2009	81.4
SB-P4-1	July 16, 2009	61.2
SB-P4-1	September 3, 2009	3.98
SB-61U-D*	December 3, 2008	2.71
SB-65U-D*	March 6, 2009	5.86
SB-65U-D	May 27, 2009	1.67
SB-65U-D	September 3, 2009	4.54
SB-66U-D*	December 3, 2008	99.0
SB-66U-D	May 27, 2009	18.4
SB-66U-D	September 3, 2009	11.9
SB-66UD-1*	March 6, 2009	5.46
SB-66UD-1	May 27, 2009	7.67
SB-66UD-1	September 2, 2009	10.8
SB-67U-D*	December 3, 2008	15.2
SB-67U-D	May 27, 2009	7.76
SB-67U-D	September 2, 2009	9.79
SB-77U-D*	December 3, 2008	1,300

SB-77U-D	May 28, 2009	3.52
SB-77U-D	September 2, 2009	25.6
SB-77U-D1*	March 6, 2009	7.88
SB-77U-D1	May 27, 2009	48.4
SB-77U-D1	September 2, 2009	37.7
SB-78U-D	November 21, 2008	234
SB-78U-D	May 28, 2009	11.4
SB-78U-D	September 2, 2009	5.26
SB-78U-D1*	March 6, 2008	7,230
SB-78U-D1	May 28, 2009	1.90
SB-78U-D1	September 2, 2009	3.73
SB-79U-D*	December 3, 2008	380
SB-79U-D	May 28, 2009	209
SB-79U-D1*	March 6, 2009	42.1
SB-79U-D1	September 2, 2009	5.21
SB-80U-D*	March 6, 2009	21,000
SB-80U-D	May 28, 2009	53.4
SB-80U-D	September 1, 2009	5.21
SB-81U-D*	December 3, 2008	3.14
SB-81U-D*	March 5, 2009	49.8
SB-81U-D	May 27, 2009	1.91
SB-81U-D	September 1, 2009	9.39
SB-85U-D*	December 3, 2008	2.46
SB-85U-D*	March 5, 2009	27.3
SB-86U-D*	December 3, 2008	2.85
SB-86U-D*	March 6, 2009	55.8
SB-88U-D*	March 6, 2009	16.1
SB-88U-D	May 28, 2009	6.30
SB-88U-D	September 2, 2009	2.51
RW-1	September 2, 2009	5.11
RW-2	September 2, 2009	4.32

Note: PCB - all units in μ g/l.

^{*} Samples collected during the December 2008 and March 2009 sampling events are not considered representative of the dissolved phase PCB concentrations in the respective samples even if SPL was not present in the well.

3.0 CONCEPTUAL SITE MODEL

The development of a conceptual site model (CSM) involves identifying the source(s) of contamination (e.g., leaking tanks or waste discharges), evaluating the movement of contaminants in various subsurface media (e.g., leaching from soil to groundwater and fate and transport in groundwater), identifying the potential exposure populations (e.g., resident, worker, recreational visitor, or ecological), and identifying and evaluating the potential exposure pathways (e.g., dermal contact, inhalation, or ingestion).

3.1 Source Identification

The RIR identified the AOC and COI in relation to the Plant 4 area. The sources of the identified contamination in relation to the Plant 4 area are:

- Historic oil leakage from hydraulic piston/pit of older melting furnaces (TAMAs).
- Iron and copper slag and ash buried beneath a significant portion of Plant 4.
- Periodic use and spillage of industrial degreasers in historic manufacturing operations.

The characterization did not reveal other significant sources of contamination or AOC in relation to the Plant 4 area.

3.2 Contaminant Identification and Movement

The COC identified in the RIR for Plant 4 soil were TCE, naphthalene, 1,2,4-TMB, 1,3,5-TMB, arsenic, chromium, lead, mercury, silver, selenium, zinc, and PCB Aroclor 1248.

The RIR explained the rationale for not retaining arsenic and chromium as COI in site soils. The remaining COI in soil were localized and not laterally extensive. Lead, mercury, silver, selenium, and zinc do not readily enter into solution or volatilize to indoor air, so those constituents are not considered to have the potential for migration. TCE, naphthalene, 1,2,4-TMB, 1,3,5-TMB, and PCB Aroclor 1248 have the greatest potential for significant migration. Each of these constituents has the potential to migrate into groundwater and all but the PCB Aroclor 1248 has the potential to volatilize into indoor air.

The COI identified above the UANRSHS MSCs were TCE, naphthalene, and 1,2,4-TMB. No exceedances were reported from soil samples collected in saturated conditions. Only TCE was reported at a concentration above its applicable Non-Residential vapor intrusion to indoor air screening value. The other COI identified in soil are not considered a potential threat to human health or the environment due to being relatively immobile, existing only in unsaturated conditions, and/or existing at concentrations below applicable vapor intrusion to indoor air screening levels.

The COI identified in Plant 4 groundwater are arsenic, barium, lead, zinc, and PCB Aroclor 1248. Arsenic, barium, lead, and zinc observed in groundwater were also localized and not laterally extensive. These constituents typically resorb to soil within very short distances and do not migrate significant distances in the dissolved-phase. The PCB Aroclor 1248 observed in groundwater is somewhat laterally extensive, but is localized in the areas surrounding former TAMA furnaces 3 and 4. Bedrock surrounding each furnace was blasted with explosives in order to facilitate the installation of the furnaces and casting pits. The blasting fractured the surrounding rock and created limited area for storage of leaking hydraulic oil. The artificial fractures created by the blasting most likely connected to the surrounding naturally-occurring fractures. Sampling of the groundwater monitoring well network indicates the extent of the PCB Aroclor has been delineated to the extent practical and has not migrated to Logan Branch. Figure 8 of **Appendix A** depicts the approximate thickness of the DNAPL containing the PCB Aroclor 1248. Figure 7 of Appendix A depicts the flow of bedrock groundwater underneath the Plant 4 area. The delineation of bedrock groundwater indicates minimal, if any, migration of the PCB Aroclor 1248 in groundwater.

In summary, the COI identified in groundwater are not considered a potential threat to human health or the environment due to being relatively immobile/localized and/or adequately delineated.

3.3 Exposure Populations

The Plant 4 area of the site is currently abandoned with no active manufacturing operations. The potential exposure populations will be evaluated using the assumption the facility would be sold and utilized for industrial purposes with employees working in the existing building.

The potential exposure populations are limited to on-site workers, utility workers, construction workers, trespassers/recreational users, and off-site receptors. Each potential exposure population is discussed in further detail below.

On-Site Worker

An on-site worker is defined as the current and/or future worker who works at the site. This worker may conduct activities outside or inside the current and/or future structure constructed at the site. It should be noted the existing structure is vacant and no future use plans to utilize the property are currently being considered.

Based on these activities, potential exposure to site COI for this receptor may occur via direct contact with indoor air (in pits or other confined spaces within the foundation of the building) during normal work day activities. The following pathway is considered complete for the on-site worker:

• Inhalation of volatiles in indoor air as a result of vapor intrusion (vapor intrusion exceedance of TCE in one soil sample).

This potentially complete exposure pathway will be addressed through indoor air sampling within the building in the area where the sole exceedance of TCE was observed.

Utility Worker

A utility worker is defined as a current and/or future receptor who would be involved with repairing and maintaining utility lines. Intrusive activities and subsequent direct contact with the subsurface soil (unsaturated and saturated zones) and shallow overburden groundwater is possible for this receptor.

The direct contact exposure pathways (ingestion, inhalation and dermal contact) for the soil matrix are not retained, because the direct contact standards (either the surface or subsurface direct contact standards) are not exceeded in soil. There are no soil exposure pathways considered complete for the utility worker.

Due to exceedances of the groundwater MSCs and the potential for direct contact exposure to groundwater during intrusive activities, the following exposure pathways are considered complete for the utility worker:

- Inhalation of volatiles emitted from groundwater to air as a result of intrusive activities.
- Dermal contact with groundwater during intrusive activities.

These potentially complete exposure pathways can be addressed through indoor air sampling, remediating the impacted bedrock groundwater, or eliminating the pathway via an Environmental Covenant (EC) with use restrictions and media handling plans.

Construction Worker

A construction worker is a current or future worker that would be involved in construction and/or excavation activities at the site. As a result, intrusive activities and subsequent direct contact with the subsurface soil (unsaturated and saturated zones) and shallow overburden groundwater is possible for this receptor.

The direct contact exposure pathways (ingestion, inhalation and dermal contact) for the soil matrix are not retained, because the direct contact standards (either the surface or subsurface direct contact standards) are not exceeded in soil. There are no soil exposure pathways considered complete for the construction worker.

Due to exceedances of the groundwater MSCs and the potential for direct contact exposure to groundwater during intrusive activities, the following exposure pathways are considered complete for the construction worker:

• Inhalation of volatiles emitted from groundwater to air as a result of intrusive activities.

• Dermal contact with groundwater during intrusive activities.

These potentially complete exposure pathways can be addressed through indoor air sampling, remediating the impacted bedrock groundwater, or eliminating the pathway via an EC with use restrictions and media handling plans.

Trespasser/Recreational User

A trespasser is defined as an individual who enters the site unauthorized. Due to the surrounding area (e.g., residential properties located around the subject site), it is possible this receptor may be a young child (7-12 years), an adolescent (13-18 years), or an adult. Potential exposure to site COI is limited to direct contact with surface soil for this receptor as this receptor is not expected to conduct intrusive activities. The surface soil is not a source of residual COI and no exceedances of the direct contact standards were reported. Therefore, no exposure pathways are retained for this receptor.

Off-Site Receptor

The off-site receptor is defined as an individual who may be exposed to site COI in soil, shallow overburden groundwater, or surface water due to the transport of COI off-site. The off-site receptor would have to engage in intrusive activities in order to come into direct contact with subsurface soil or shallow overburden groundwater. The property surrounding Plant 4 is owned by Bolton and not suitable for development. The off-site receptor may come into contact with surface water (Logan Branch) which runs adjacent to Plant 4 and eventually off-site. Analytical data from downgradient shallow overburden groundwater monitoring wells in Plant 4 indicate site COI are below applicable MSCs in point-of-compliance (POC) wells along Logan Branch. This exposure pathway is not retained. Modeling of potential constituent discharge to Logan Branch via diffuse shallow overburden groundwater discharge can be completed in order to support the non-retainment of this exposure pathway.

3.4 Exposure Pathways

The potential exposure pathways for Plant 4 include dermal contact, inhalation, and ingestion. The results of the remedial investigation and development of the CSM narrowed the potentially-complete exposure pathways to the following:

- Inhalation of volatiles in indoor air as a result of vapor intrusion (vapor intrusion exceedance of TCE in one soil sample) for the on-site worker.
- Inhalation of volatiles emitted from groundwater to air as a result of intrusive activities for the utility/construction worker.
- Dermal contact with groundwater during intrusive activities for the utility/construction worker.
- These potentially complete exposure pathways can be addressed by indoor air sampling, remediating the impacted bedrock groundwater, or eliminating the

pathway via an EC with use restrictions and media handling plans. Indoor air sampling, a soils/overburden handling plan, and a groundwater use restriction would address and eliminate the potentially-complete exposure pathways.

4.0 INTERIM REMEDIAL ACTIONS

Various interim remedial actions have been completed in Plant 4 since the site characterization began. The remedial actions are listed below with further detail in the following paragraphs.

- The shutdown of operations and decommissioning of equipment within Plant 4.
- Removal of acid pickling vats and the associated concrete, bricks, and gravel with the pickling vats.
- Cleaning and disposal of oils, cuttings, and other hazardous items associated with the industrial process of brass.
- The abandonment of Tamas 1-5, the sister borehole of Tama 5, and dewatering well.
- The cleaning of various pits within Plant 4.
- The recovery of DNAPL within well SB-79U-D using a Blackhawk pump.
- The removal of DNAPL within monitoring and recovery wells in the Tama 3 and 4 area using disposable bailers.

The shutdown of operations and decommissioning of equipment allowed for areas of the plant that contained oils for either storage or processes to be removed and cleaned. The equipment within Plant 4 was purchased by Chase Brass & Copper Co., Inc. (Chase) with the option to inspect the equipment and either keep it for their operations, sell the equipment to a third party, or leave the equipment within Plant 4 for Bolton to dispose or sell. Once the equipment was removed, the areas were cleaned and the remaining infrastructure from the removed equipment was scrapped. This included, but not limited to, electrical lines within floor chases, pipes (water, hydraulic lines, etc), acid pickling vats, storage bins, and various support structures.

During the decommissioning of the plants, the boreholes that contained Tamas 1 through 5, and the sister borehole of Tama 5 were filled with concrete. The hydraulic pistons were first removed and any oil remaining in the boreholes or the annular space between the floor and the casing of the Tama was pumped into 55 gallon DOT approved drums. An attempt to remove brass cuttings within the annular space was made; however, the cuttings were encapsulated in concrete due to the depth and hardness of the cuttings. Concrete trucks were driven into the plant and poured the concrete slurry mix directly into the boreholes and pits, ensuring complete closure and abandonment of the annular space. The concrete was finished flush with the existing floor. This same process occurred for the six Tama boreholes and the dewatering well within the Tama 5 area.

Once the equipment and infrastructure were removed within Plant 4, Odyssey Environmental Services (Odyssey) was contracted to clean and remove oils and other hazardous materials from the plant. All items were disposed of at the proper facilities.

4.1 Remedial Objectives

The purpose of the Cleanup Plan was to accomplish particular Remedial Action Objectives (RAOs). The RAOs for Plant 4 are as follows:

- To remove DNAPL in groundwater to the maximum extent practical.
- To completely eliminate potential exposure pathways and protect sensitive receptors such as Logan Branch.
- Achieve closure of the Plant 4 Area via PADEP SHS or SSS.

4.2 Remedial Feasibility Testing

Remedial feasibility testing was completed at the Plant 4 site in order to facilitate the selection of an appropriate remedial technology for impacted groundwater and the presence of DNAPL.

- Hydraulic testing of the Plant 4 area revealed groundwater could be extracted. A five gallon per minute (gpm) Grundfos pump was used to conduct a limited pumping event to determine a pumping rate and radius of influence.
- Product removal using a Vector Pneumatic Piston Pump Model 101VB (Vector) was evaluated to determine the effectiveness of removing the DNAPL. The Vector is powered by compressed air and uses a control motor located at surface grade. Power to the pump is direct from grade through the sucker rod assembly which removes water and DNAPL from a two inch diameter well casing. The fluid inlet is located at the bottom of the pump intake cylinder, thus making it an ideal pump to remove DNAPL.
- Installation of a 10-inch stainless steel recovery well within the middle of the suspected area of contamination. The recovery well, RW-3, was installed with a "rat tail" or a riser under the screened section of the well to collect the DNAPL.
- Product removal using hydrophobic oil adsorbing socks and disposable bailers was conducted.
- Monitoring of dissolved phase PCB concentrations in point of compliance wells.

4.3 Remedial Alternatives Summary

The aforementioned remedial feasibility testing is summarized in the following sections. The results of DNAPL gauging and monitoring is further explained in Sections 5.3 and 6.2.

4.3.1 Groundwater Extraction

A limited groundwater extraction event was conducted on SB-78U-D on May 1, 2009. The surrounding monitoring wells, SB-65U-D, SB-66U-D, SB-66U-D1, SB-67U-D, SB-77U-D1, SB-78U-D, SB-78U-D1, SB-79U-D1, SB-79U-D1,

80U-D, SB-81U-D, SB-85U-D, SB-86U-D, and SB-88U-D were monitored to determine the area of influence. During the groundwater extraction event, well SB-78U-D had a 0.22 feet drawdown while the nearest observation well had a drawdown of 0.11 feet. It was determined the pump needed to create the type of drawdown to remediate the dissolved phase concentrations observed in the groundwater would be extremely large and cost prohibitive. This was confirmed by Cerro personnel who described the dewatering system used at Tama 5. The dewatering system consisted of a 600 gpm pump that cycled throughout the day to prevent the pit at Tama 5 from filling with water. The cycling was approximately five minutes of shut down and one to two minutes of pumping. With this information and the amount of granular activated carbon (GAC) needed to remediate the water, it was determined groundwater extraction would not be cost feasible nor would it effectively remove the DNAPL.

4.3.2 Vector Pump DNAPL Extraction

A Vector was purchased to remove DNAPL from the monitoring/recovery wells. At the time of purchase, SB-79U-D had approximately 17 feet of DNAPL within the well column. The Vector was installed on the well and removed product for ten months. During each weekly site visit, the Vector was connected to an air compressor and DNAPL was removed. The Vector had a ball float in the sucker rod which would trap the DNAPL within the pipe once the Vector was powered. As the column would fill with DNAPL, it was able to be removed and transferred into a 55-gallon drum. The Vector pump was successful as the well continued to produce DNAPL, however, as the volume decreased within the well column, the DNAPL was not able to be pumped through the discharge pipe. The Vector was removed from the well and was no longer used in Plant 4.

4.3.3 Manual DNAPL Extraction

Once the Vector was no longer being used, disposable bailers and hydrophobic oil adsorbing socks were used to attempt to remove the DNAPL. The socks were attached to a string and placed into a steel cage and lowered into the wells to absorb the DNAPL. This procedure was attempted multiple times without success. The socks did not absorb the DNAPL as expected and instead smeared the well column with DNAPL. Oil adsorbing socks were abandoned as a remedial technique.

Disposable bailers were successful in removing DNAPL with little groundwater being removed. A dedicated disposable bailer was assigned to each well with DNAPL. Each week after gauging the DNAPL level, the bailer was lowered into the well and then removed from the well with a DNAPL/groundwater mixture. The DNAPL was emptied into a 55-gallon drum. The process was continued until the amount of DNAPL being removed was impracticable. It was the only process that appeared to remove the most DNAPL while being the most cost effective. However, the levels of DNAPL have decreased slightly throughout the two year process.

4.3.4 DNAPL Monitoring

The monitoring of dissolved phase PCB concentrations in select wells along with gauging of DNAPL levels within select wells has been considered as a remedial alternative. Throughout the characterization and remedial phases in Plant 4, dissolved phase concentrations have been monitored in the well network. The concentrations have been either non-detect or have exceeded the PADEP UANRSHS at relatively low levels. Due to the viscosity of the DNAPL, it can be monitored for large increases or decreases in thickness within the well network. This remedial alternative is being chosen for the Plant 4 site and for the Post Remedial Care Plan (PRCP).

4.4 Interim Remedial Actions

On January 1 and/or March 5, 2009, weekly gauging of groundwater and DNAPL levels began with a select group of monitoring and recovery wells within Plant 4. Monitoring wells SB-77U-D, SB-77U-D1, SB-78U-D, SB-78U-D, SB-78U-D1, SB-79U-D1, SB-80U-D, SB-81U-D, SB-88U-D, and recovery wells RW-1, RW-2, and RW-3 were monitored for DNAPL levels, LNAPL levels, and groundwater elevations. Throughout the entire monitoring period, LNAPL was never encountered in any of the previously mentioned wells and it is believed to be a non-issue. Monitoring wells SB-78U-S, SB-79U-D1, SB-81U-D, and recovery well RW-3 have not had measurable DNAPL levels within them and this is not expected to change.

Monitoring wells SB-77U-D, SB-77U-D1, SB-78U-D, SB-78U-D1, SB-80U-D, SB-88U-D, and recovery wells RW-1 and RW-2 have had or currently contain measurable levels of DNAPL within their well columns. These monitoring and recovery wells have had DNAPL recovered since September 2, 2009. All DNAPL liquids have been placed into 55-gallon drums, labeled, and have been or will be disposed of through the proper facility. The amounts of DNAPL gauged and observed is discussed in Section 6.2.

5.0 CLEANUP PLAN AND CONCEPTUAL SITE MODEL SUMMARY

The goal of the remedial cleanup plan was to remove DNAPL from groundwater to the maximum extent practical, eliminate potential exposure pathways, and achieve site closure via SHS or SSS and pathway elimination.

5.1 DNAPL Mitigation

Recovery of DNAPL from well SB-79U-D has been achieved to the maximum extent practical using the total fluids pump. However, additional DNAPL recovery was attempted using both disposable bailers and hydrophobic oil-adsorbing socks. The bailers allowed for removal of a majority of the DNAPL which accumulates in a well. Both methods of product recovery were attempted, however, after two years of recovery it appears it is no longer effective and is cost prohibitive.

DNAPL and groundwater gauging events were completed on a weekly basis to recover DNAPL. Long-term monitoring of the DNAPL is proposed to ensure the amount recovered is to the maximum extent practical and to ensure no further remedial efforts are warranted. The exposure pathway will be eliminated via a groundwater use restriction as part of the EC.

5.2 Exposure Pathway Elimination

The potential exposure pathways for Plant 4 include dermal contact, inhalation, and ingestion. An indoor air sample was collected in the area where the single exceedance of TCE in soil was reported. The indoor air sample was submitted for analysis of TCE and the results were screened against residential soil vapor MSCs. The results are presented later in this report. A soil vapor sampling plan was prepared for review and approved by the PADEP.

An EC has been prepared and included with this report for the Plant 4 area. The EC includes a soils/overburden handling plan and a groundwater use restriction. The soils handling plan details the methods and procedures to be followed if soil beneath Plant 4 is disturbed. Proper handling will eliminate the potential for dermal exposure, ingestion, or inhalation.

The groundwater use restriction specifies groundwater beneath Plant 4 cannot be utilized for potable purposes. This eliminates the potential for exposure to impacted groundwater via ingestion or inhalation. In summary, the use restrictions placed upon the Plant 4 Area under the EC eliminates the potential exposure pathways. The PADEP can then issue a relief-of-liability for Plant 4 via SSS and exposure pathway elimination.

5.3 Cleanup Plan and Site Closure

Approximately 116 (3 years) of DNAPL gauging events were completed to determine the areas where measureable DNAPL was still present. The DNAPL appears to be isolated to the area surrounding SB-79U-D. **Figure 8** of **Appendix A** depicts the measureable thickness of DNAPL and indicates the extent of measureable DNAPL is delineated in all directions.

Manual recovery of the DNAPL via a disposable bailer was completed in each well with more than 0.1 feet of DNAPL. Oil-adsorbing socks were then installed in two wells in an attempt to recover DNAPL that had re-accumulated. Manual DNAPL recovery was completed on a weekly basis. The socks were also checked on a weekly basis to determine if the oil was being adsorbed or not. The combination of the manual recovery and adsorbent socks were intended to reduce the thickness of the DNAPL to less than 0.1 feet in each well. As stated previously, the absorbent socks did not become saturated with the DNAPL and were therefore abandoned.

The PADEP requires post-remedial monitoring as part of pursuing site closure using SSS via pathway elimination. A quarterly gauging and sampling event is being proposed for three years following the submission and approval of this Final Report for the Plant 4 area. Each groundwater gauging event would include wells SB-66U-D, SB-66U-D1, SB-67U-D, SB-77U-D1, SB-78U-D, SB-78U-D1, SB-79U-D, SB-79U-D1, SB-80U-D, SB-81U-D, SB-88U-D, SB-89U-D1, RW-1, RW-2 and RW-3. Groundwater sampling will be conducted on wells SB-65U-D, SB-66U-D, SB-67U-D, SB-76U-D, SB-78U-D1, SB-81U-D, SB-89U-D, and SB-89UD1 during the PRCP. Groundwater gauging and sampling will be completed using the USEPA Region 3 Low-Flow Sampling Procedure. The results of the quarterly reporting will be summarized in quarterly reports which will be submitted to the PADEP. Quarterly reports will be submitted for the three years of post-remedial monitoring.

The Cleanup Plan established RAOs which included removing DNAPL to the maximum extent practical, eliminating potential exposure pathways, and protecting sensitive receptors (such as Logan Branch). The Cleanup Plan proposed to accomplish the RAOs and address the potentially complete exposure pathways by completing indoor air sampling, implementing alternate methods to remediate impacted bedrock groundwater, and eliminating certain potentially-complete exposure pathways via an EC with use restrictions and media handling plans. Specifically, the additional remedial actions proposed in the Cleanup Plan were as follows:

- Indoor air sampling near soil boring SB-61U (Completed to eliminate the vapor intrusion to indoor air exposure pathway).
- Pumping and removing DNAPL on a weekly basis from wells which exhibit greater than 0.1 feet of DNAPL in Plant 4 until no further product can be

recovered (Proposed to remove DNAPL in groundwater to the maximum extent practical and protecting Logan Branch).

- Product recovery in wells with greater than 0.1 feet of DNAPL using bailers and adsorbent socks in an attempt to recover DNAPL to the maximum extent practical (Proposed to remove DNAPL in groundwater to the maximum extent practical and protecting Logan Branch).
- Prepare and implement an EC for the Plant 4 area that restricts groundwater use for any purpose and requires a soils handling plan be prepared if impacted soil is disturbed at any time (Proposed to eliminate potentially-complete exposure pathways).

The Cleanup Plan specified the additional DNAPL recovery would be completed for five years following the submission and approval of the Final Report. Given the extreme difficulty and expense to remove DNAPL from the subsurface, three years of post-remedial monitoring is believed to be sufficient to support the conclusions made as part of attainment of SSS. DNAPL and groundwater gauging events are currently being completed on a weekly/monthly basis to ensure no further DNAPL recovery is viable. Post-remedial monitoring of the DNAPL is proposed after DNAPL has been recovered to the maximum extent practical to ensure no further remedial efforts are warranted. The exposure pathway will be eliminated via a groundwater use restriction as part of the EC.

6.0 DEMONSTRATION OF ATTAINMENT

6.1 Indoor Air Sampling and Soil Vapor

One soil sample collected as part of the site characterization reportedly contained TCE at a concentration above its applicable Non-Residential vapor intrusion to indoor air screening value. In order to eliminate the potentially complete vapor intrusion to indoor air exposure pathway, indoor air sampling was completed at the location of the reported exceedance (SB-61U).

A Soil Vapor Sampling Plan dated November 15, 2010 was prepared for review and approval by the PADEP. The PADEP approved the plan in e-mail correspondence dated November 16, 2010. Prior to the sampling event, the area surrounding SB-61U was screened with a PID. This was done to establish a baseline concentration of volatile organic vapors in the air. No volatile organic vapors were measured with the PID. Air sampling was initiated immediately after the PID survey.

For the sampling event, Lancaster Laboratories, Inc. (Lancaster Labs) prepared two Summa canisters to obtain a flow controlled 8-hour sample. This was done via placing an initial negative pressure (approximately -30 inches of mercury (Hg)) on each canister, placing a flow control valve on each canister, and opening the canisters in the area of concern. The canisters were placed directly above SB-61U for a total of 8 hours. The second canister was utilized for the collection of a duplicate sample for comparison to the actual sample. Following the 8-hour test period, the canisters were sealed and shipped to Lancaster Labs for analysis of TCE using USEPA Method TO-15. The sampling event was completed on November 29, 2010. The analytical results of the indoor air sampling event are presented in Table 5.

Table 5
Analytical Results for Initial Indoor Air Sampling Event
November 29, 2010

The second secon	ASS ATRICAL SELECTION OF THE PROPERTY OF THE P
Constituent	TCE
Residential Indoor Air Criteria MSC	0.081
Residential Soil Gas MSC (mg/m ³)	813
Sample ID	Analytical Results
Sample ID SVS #1	Analytical Results <0.00072

Notes: Results Reported in milligrams per cubic meter (mg/m³).

In order to be conservative, the indoor air sampling data was compared to the Residential vapor intrusion to indoor air screening value. No exceedance of the applicable Residential Indoor Air MSC was reported. The vapor intrusion to indoor air exposure pathway is considered incomplete.

6.2 DNAPL Gauging and Recovery

The thickness of DNAPL has been routinely gauged from the installation of the well (January/March 2009) to the present in wells SB-77U-D, SB-77U-D1, SB-78U-D1, SB-79U-D, SB-80U-D, SB-88U-D, RW-1, and RW-2. The DNAPL thickness readings were compiled for each well and are presented in a graphical format in **Appendix E**. With the exception of wells SB-80U-D and RW-2, the overall thickness of the DNAPL in wells has decreased over time. The overall decreasing DNAPL thickness over a majority of the Plant 4 area indicates a stable/shrinking plume.

In order to further evaluate the overall stability of the DNAPL, a Mann-Kendall statistical analysis was completed. A Mann-Kendall analysis is a statistical analysis which determines if the data indicate a particular trend (increasing, stable, or decreasing). The Mann-Kendall spreadsheet only allows ten data points to be entered, therefore the last two years of quarterly data was selected. This approach provided eight readings, the first two readings were then selected from each half of 2009, when the initial readings began. By selecting the data in this manner, it allowed for seasonal trends and for a broader trend analysis to be completed by the Mann-Kendal program. The Mann-Kendall spreadsheets are included as **Appendix F**. The statistical analysis indicates the following trends:

- SB-77U-D A decreasing trend in DNAPL was observed for ten gauging events (March 2009 – November 2011).
- SB-78U-D A decreasing trend in DNAPL was observed for ten gauging events (April 2009 November 2011).
- SB-79U-D A decreasing in DNAPL was observed for ten gauging events (March 2009 November 2011).
- SB-80U-D A stable trend in DNAPL was observed for ten gauging events (March 2009 November 2011).
- SB-88U-D A stable trend in DNAPL was observed for ten gauging events (March 2009 November 2011).
- RW-1 A decreasing trend in DNAPL was observed for ten gauging events (June 2009 November 2011).
- RW-2 A stable trend in DNAPL was observed for ten gauging events (June 2009 November 2011).

The results of the Mann-Kendall supports the assertion of a shrinking/stable DNAPL plume in the Plant 4 area. In total, approximately 100 gallons of a DNAPL/water mixture has been removed and containerized. This total represents over two years of remedial actions. The rate of DNAPL removal is extremely slow and not costs-effective. In

summary, DNAPL recovery has been achieved to the maximum extent practical using pumps and disposable bailers.

The presence of measureable DNAPL dictates an EC must be implemented on Plant 4 and will include a soils/overburden handling plan and a groundwater use restriction. The soils handling plan will detail the methods and procedures to be followed if soil beneath Plant 4 is disturbed. Proper handling will eliminate the potential for dermal exposure, ingestion, or inhalation. The groundwater use restriction will specify that groundwater beneath Plant 4 cannot be utilized for potable purposes. This will eliminate the potential for exposure to impacted groundwater via ingestion or inhalation. In summary, the use restrictions placed upon the Plant 4 Area under the EC will eliminate the potential exposure pathways. The PADEP can then issue a relief-of-liability for Plant 4 via SSS and exposure pathway elimination.

6.3 Soil Attainment

The initial screening of the soil analytical data was completed using the PADEP Soil-to-Groundwater UANRSHS MSCs. The higher of the 100x GW MSC and the Generic Value was utilized to identify each COI. The COI identified as part of the initial soil characterization were TCE, naphthalene, 1,2,4-TMB, 1,3,5-TMB, arsenic, chromium, lead, mercury, silver, selenium, zinc, and PCB Aroclor 1248. Ten soil samples from the initial soil characterization were selected from across the entire property with the highest reported concentrations of each COI. Of those ten, the four samples with the highest concentrations of each COI (except TCE where only two samples were selected) were selected from SPLP sampling and analysis. The sampling for the SPLP did not identify certain constituents (mercury, silver, and selenium) which were observed in the initial soil characterization. Therefore, these constituents could not be submitted for SPLP analysis. The SPLP analysis is also not typically applicable to volatile constituents as the process involves percolation (and potential volatilization) of liquid through soil samples. Due to the observation of TCE in other areas of the site, soil samples from Plant 4 containing TCE were submitted for SPLP analysis. In summary, only arsenic, chromium, copper, lead, zinc, PCB Aroclor 1248, and TCE were submitted for SPLP analysis.

The Generic Value established by the PADEP for each COI is based upon a scientifically derived leaching equation and is intended to protect receptors where no groundwater investigations have been performed. However, the generic value may be replaced by an alternate soil-to-groundwater standard determined by a SPLP analysis of soil from the site. The result of the SPLP analysis can then be compared directly to the groundwater MSC for each COI.

Soil sampling and SPLP analysis were completed for arsenic, chromium, copper, lead, zinc, PCB-1248, and TCE. Please note, only the SPLP results for the COI (TCE, arsenic,

copper, lead, chromium, zinc, and PCB Aroclor 1248) identified as part of the Plant 4 characterizations are presented below.

Table 6 Summary of SPLP Sampling and Analysis

TCE

SPLP Soil Sample ID	Direct Contact Residential MSC	PADEP Residential Soil- to-Groundwater MSC	SPLP Concentration	Residential Groundwater MSC
SB-7U-SPLP-0-1'	260	0.5	<50.0	5
SB-42U-SPLP-2-4'	260	0.5	<50.0	5

Notes: Direct Contact and Soil-to-Groundwater MSCs in milligrams per kilogram (mg/kg). SPLP Concentration and Groundwater MSC in micrograms per liter (ug/L).

Arsenic

SPLP Soil Sample ID	Direct Contact Residential MSC	PADEP Residential Soil- to-Groundwater MSC	SPLP Concentration	Residential Groundwater MSC
SB-12U-SPLP-24-25'	12	29	< 0.02	10
SB-26U-SPLP-9-10'	12	29	< 0.02	10
SB-39U-SPLP-4-5'	12	29	< 0.02	10
SB-49U-SPLP-2-4'	12	29	< 0.02	10

Notes: Direct Contact and Soil-to-Groundwater MSCs in mg/kg. SPLP Concentration and Groundwater MSC in ug/L.

Chromium

SPLP Soil Sample ID	Direct Contact Residential MSC	PADEP Residential Soil- to-Groundwater MSC	SPLP Concentration	Residential Groundwater MSC
SB-3U-SPLP-1-2'	190,000	190,000	0.0275	100
SB-4U-SPLP-5-6'	190,000	190,000	0.0201	100
SB-30U-SPLP-8-10'	190,000	190,000	< 0.005	100
SB-33U-SPLP-1-2'	190,000	190,000	< 0.00877	100

Notes: Direct Contact and Soil-to-Groundwater MSCs in mg/kg. SPLP Concentration and Groundwater MSC in ug/L.

Copper

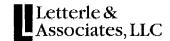
SPLP Soil Sample ID	Direct Contact Residential MSC	PADEP Residential Soil- to-Groundwater MSC	SPLP Concentration	Residential Groundwater MSC
SB-3U-SPLP-1-2'	8,100	43,000	< 0.05	1,000
SB-69U-SPLP-0-2'	8,100	43,000	< 0.05	1,000
SB-93U-SPLP5-1.5'	8,100	43,000	< 0.05	1,000
SB-1B-SPLP-5-6'	8,100	43,000	< 0.05	1,000

Notes: Direct Contact and Soil-to-Groundwater MSCs in mg/kg. SPLP Concentration and Groundwater MSC in ug/L.

Lead

SPLP Soil Sample ID	Direct Contact Residential MSC	PADEP Residential Soil- to-Groundwater MSC	SPLP Concentration	Residential Groundwater MSC
SB-3U-SPLP-1-2'	500	450	< 0.0100	5
SB-30U-SPLP-8-10'	500	450	< 0.0100	5
SB-93U-SPLP5-1.5'	500	450	< 0.0100	5
SB-21B-SPLP-4-5'	500	450	< 0.319	5

Notes: Direct Contact and Soil-to-Groundwater MSCs in mg/kg. SPLP Concentration and Groundwater MSC in ug/L.



Zinc

SPLP Soil Sample ID	Direct Contact Residential MSC	PADEP Residential Soil- to-Groundwater MSC	SPLP Concentration	Residential Groundwater MSC
SB-3U-SPLP-1-2'	66,000	12,000	< 0.0500	2,000
SB-29U-SPLP-8-10'	66,000	12,000	< 0.0835	2,000
SB-61U-SPLP-5-7'	66,000	12,000	<0.0050	2,000
SB-93U-SPLP5-1.5'	66,000	12,000	< 0.0050	2,000

Notes: Direct Contact and Soil-to-Groundwater MSCs in mg/kg. SPLP Concentration and Groundwater MSC in ug/L.

PCB Aroclor 1248

SPLP Soil Sample ID	Direct Contact Residential MSC	PADEP Residential Soil- to-Groundwater MSC	SPLP Concentration	Residential Groundwater MSC
SB-3U-SPLP-1-2'	9	16	<0.5	1.3
SB-17U-SPLP-3-4'	9	16	<0.5	1.3
SB-33U-SPLP-1-2'	9	16	< 0.5	1.3
SB-86U-SPLP-3-5'	9	16	< 0.5	1.3

Notes: Direct Contact and Soil-to-Groundwater MSCs in mg/kg.

SPLP Concentration and Groundwater MSC in ug/L.

The SPLP analytical results for each COI were compared to the applicable PADEP Used-Aquifer (total dissolved solids ≤2,500 milligrams per liter (mg/L)) Residential Statewide Health Standard (UARSHS) Groundwater MSCs. The comparison indicates arsenic, lead, chromium, copper, zinc, and PCB-1248 do not exceed the applicable Groundwater MSC and therefore meet the residential SHS. The SPLP results for TCE indicate less than 50 ug/L will leach into groundwater, but the Groundwater MSC is 5 ug/L. TCE was not observed in the Plant 4 wells, which further supports the assertion that TCE in soil is not leaching into groundwater. The SPLP results indicate the COI observed in soil in the Plant 4 area will not leach into groundwater at concentrations exceeding applicable UARSHS MSCs.

6.4 Groundwater Elevation Data

The depth-to-groundwater was measured to determine groundwater elevations and interpret the direction of groundwater movement during each sampling event. The groundwater measurements were recorded using either an oil/water interface probe or water level meter capable of measuring to within 0.01 feet of groundwater. The instruments were thoroughly decontaminated between wells to prevent cross-contamination. The groundwater elevation data for the most recent groundwater gauging event is presented in Table 7.

Table 7
Groundwater Elevation Data

Well	Date	Top of Casing Elevation	Depth to Water	Water Elevation
SB-65U-D	13-Sept-11	796.62	7.00	789.62
SB-66U-D	13-Sept-11	796.31	6.70	789.61
SB-66U-D1	13-Sept-11	796.34	6.70	789.64
SB-67U-D	13-Sept-11	796.14	6.48	789.66
SB-77U-D	13-Sept-11	796,51	7.12	789.39
SB-77U-D1	13-Sept-11	796.49	6.96	789.53
SB-78U-S	13-Sept-11	796.49	7.08	789.41
SB-78U-D	13-Sept-11	796.60	7.08	789.52
SB-78U-D1	13-Sept-11	796.37	6.98	789.39
SB-79U-D	13-Sept-11	796.18	6.73	789.45
SB-79U-D1	13-Sept-11	796.71	7.27	789.44
SB-80U-D	13-Sept-11	796.63	7.10	789.53
SB-81U-D	13-Sept-11	796.66	6.79	789.87
SB-88U-D	13-Sept-11	796.22	6.57	789.65
RW-1	13-Sept-11	796.59	7.27	789.32
RW-2 13-Sept-11		796.23	6.85	789.38
RW-3	13-Sept-11	795.83	6.99	788.84

Notes: Top of casing and groundwater elevations are measured in ft-amsl. Depth to water is measured in feet below top of casing (ft-btoc).

As indicated in Table 7, the groundwater elevations during the September 13, 2011 gauging event ranged from an elevation of 788.84 ft-amsl in RW-3 to 789.87 ft-amsl in SB-81U-D. A groundwater contour map for the September 13, 2011 gauging event is presented in **Appendix A**, **Figure 7**.

As interpreted from the groundwater potentiometric surface contour map, the predominant direction of natural groundwater flow is from Logan Branch towards SR 144, or in an easterly direction. The overall groundwater flow is consistent with the direction of natural groundwater flow observed in previous monitoring events.

6.5 Groundwater Quality

Groundwater at the site was sampled on September 13, 2011 in point of compliance (POC) wells SB-65U-D, SB-66U-D1, SB-67U-D, SB-76U-D, SB-78U-D1, SB-81U-D, SB-89U-D, and SB-89U-D1. The monitoring wells were gauged, purged, and sampled. Subsequent to gauging the depth-to-groundwater, the low flow sampling technique previously discussed was used to monitor the groundwater's parameters. Sampling of the wells was not conducted until the parameters stabilized and the purged water appeared clear.

The groundwater samples were sealed in laboratory supplied glassware, labeled, placed in a cooler filled with ice, and returned to the office where they were placed in a refrigerator at 4 °C until they were picked up by the laboratory. The samples were submitted to Fairway for PCB Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260 via USEPA

Method 8082 and were accompanied by a Chain-of-Custody. The laboratory results for the September 13, 2011 sampling event are summarized in Table 8. The laboratory reports are included in **Appendix C**.

Table 8
Groundwater Analytical Results
September 13, 2011

Well/ Compound	PCB 1016	PCB 1221	PCB 1232	PCB 1242	PCB 1248	PCB 1254	PCB 1260
PADEP UANRSHS MSC	7.2	5.2	5.2	5.2	1.4	1.4	4.3
SB-65U-D	< 0.100	< 0.250	< 0.250	< 0.250	3.08	< 0.250	< 0.100
SB-66U-D1	< 0.100	< 0.250	< 0.250	< 0.250	3.64	< 0.250	< 0.100
SB-67U-D	< 0.100	< 0.250	< 0.250	< 0.250	6,85	< 0.250	<0.100
SB-76U-D	< 0.100	< 0.250	< 0.250	< 0.250	1.21	< 0.250	< 0.100
SB-78U-D1	< 0.100	< 0.250	< 0.250	< 0.250	1.92	< 0.250	< 0.100
SB-81U-D	< 0.100	< 0.250	< 0.250	< 0.250	8.75	< 0.250	< 0.100
SB-89U-D	< 0.100	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	<0.100
SB-89U-D1	< 0.100	< 0.250	< 0.250	< 0.250	< 0.250	< 0.250	<0.100

Notes: Concentrations reported in µg/L.

Bold values indicate laboratory reporting limit (LRL) was exceeded.

Bold and shaded values indicate PADEP UANRSHS MSC has been exceeded.

As indicated in Table 8, during the September 13, 2011 sampling event, wells SB-65U-D, SB-66U-D1, SB-67U-D, SB-78U-D1, and SB-81U-D were reported to contain PCB 1248 at concentrations above its PADEP UANRSHS MSC. No other exceedances of applicable PADEP UANRSHS MSCs for PCB compounds were reported.

A constituent concentration contour map for PCB Aroclor 1248 for the September 13, 2011 sampling event is presented in **Appendix A**, **Figure 8**.

6.6 Environmental Covenant

An Environmental Covenant is required to eliminate exposure pathways based upon the results of the site characterization. Specifically, concentrations of arsenic and PCB Aroclor 1248 observed in soil exceed their respective direct contact standards. The proposed EC will include a soils/overburden handling plan to address the soil exceedances and a groundwater use restriction to address the COI in groundwater. The soils handling plan will detail the methods and procedures to be followed if soil beneath Plant 4 is disturbed. Proper handling will eliminate the potential for dermal exposure, ingestion, or inhalation. The groundwater use restriction will specify that groundwater beneath Plant 4 cannot be utilized for potable purposes. This will eliminate the potential for exposure to impacted groundwater via ingestion or inhalation. In summary, the use restrictions placed upon the Plant 4 Area under the EC will eliminate the potential exposure pathways. The PADEP can then issue a relief-of-liability for Plant 4 via SSS and exposure pathway elimination.

6.7 Summary

Groundwater within Plant 4 was gauged and sampled on September 13, 2011 during the third quarter monitoring period. The monitoring activities included gauging groundwater and DNAPL levels in the monitoring and recovery wells and sampling of the wells within Plant 4.

In summary, the potential exposure pathways have been eliminated via indoor air sampling, SPLP sampling and analysis, and/or the EC. Attainment of SSS has been demonstrated for soil and groundwater in Plant 4. A relief-of-liability is requested for Plant 4 by the Marmon Group.

7.0 POST REMEDIAL CARE PLAN

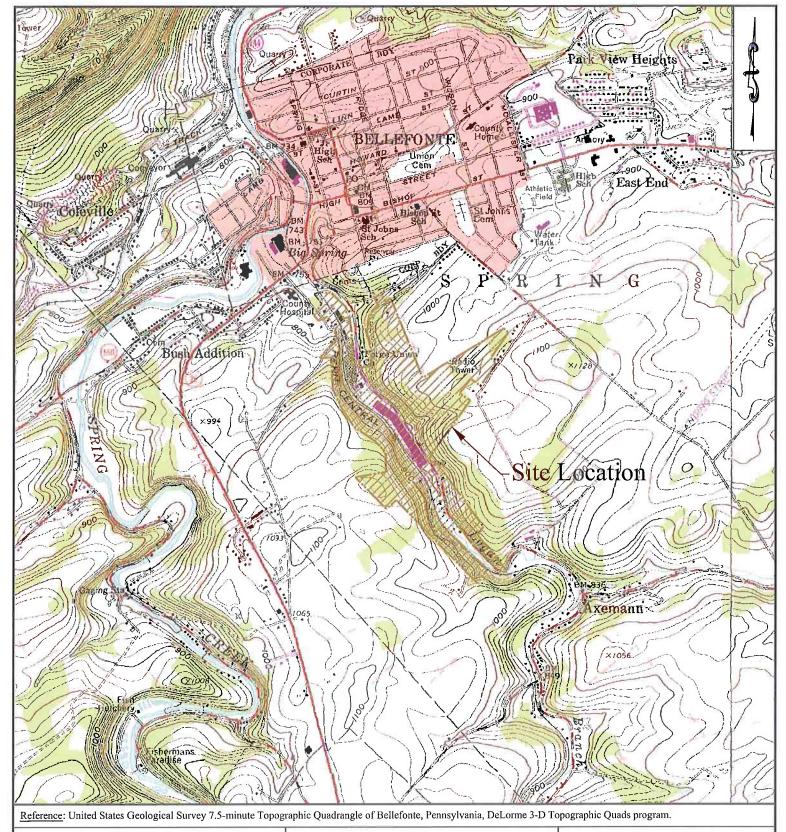
In accordance with Section § 250.411 of Act 2, if engineering or institutional controls are needed to maintain a standard, if the fate and transport analysis indicates that the remediation standard may be exceeded at the point of compliance in the future, or, if the remediation relies on natural attenuation, a PRCP shall be documented in the Final Report that includes the information identified in § 250.204(g). The information required for the PRCP is as follows:

- Reporting of any instance of nonattainment.
- Reporting of measures to correct nonattainment conditions.
- Monitoring of POC wells SB-65U-D, SB-66U-D1, SB-67U-D, SB-76U-D, SB-78U-D1, SB-81U-D, SB-89U-D, and SB-89U-D1 on a quarterly basis, or as otherwise approved by the Department, that demonstrates the effectiveness of the remedy and periodic reporting of monitoring results and analysis.
- Maintenance of records at the property where the remediation is being conducted for monitoring, sampling, and analysis.
- A schedule for operation and maintenance of the controls and submission of proposed changes.
- If requested by the Department, documentation of financial ability to implement the remedy and the PRCP.

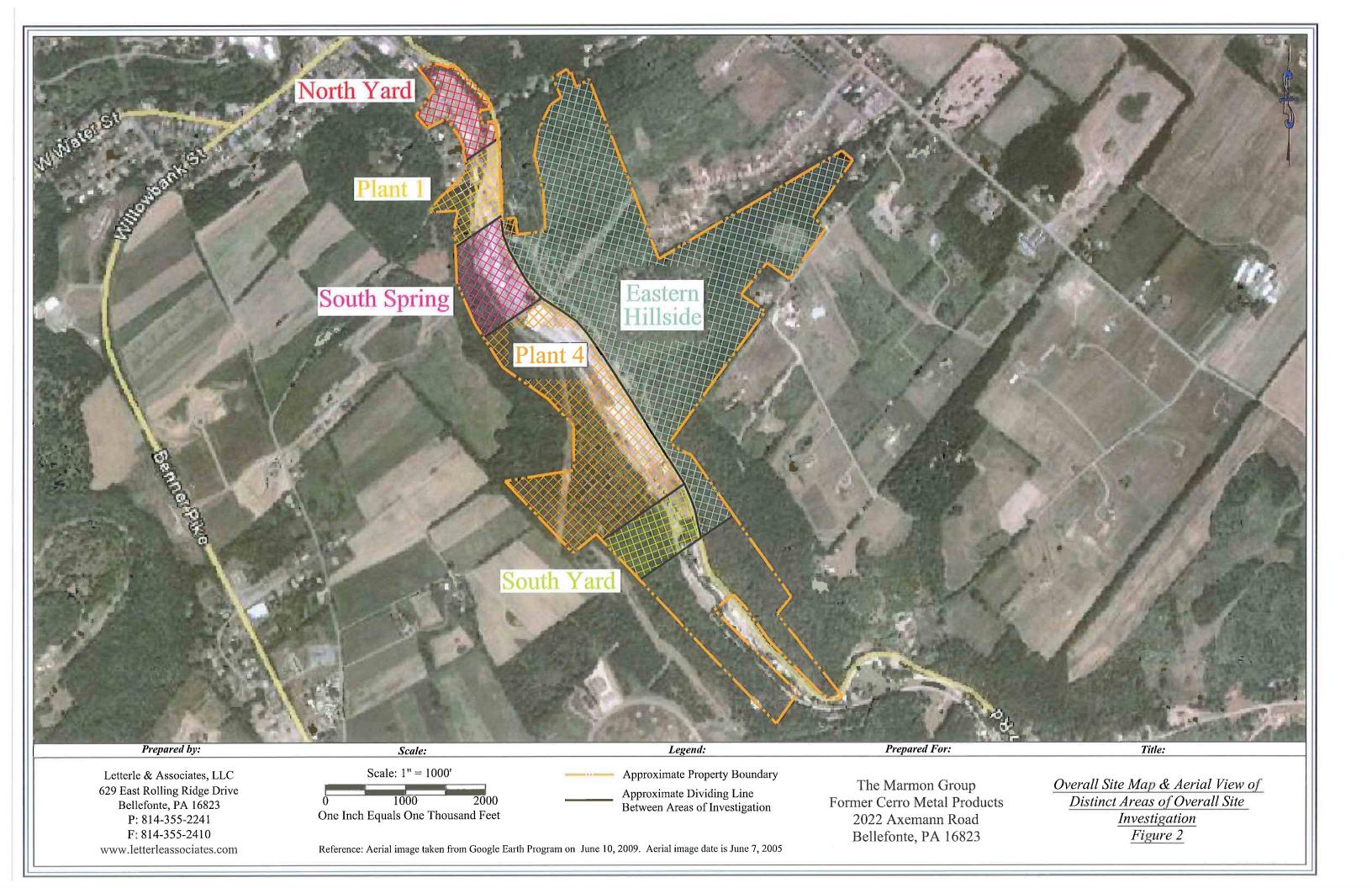
The proposed PRCP includes three years of quarterly monitoring and reporting to demonstrate the stability of the DNAPL plume and demonstrate the SSS is being attained at the POC. The reporting will include documenting any instance of nonattainment and the measures taken to reattain the selected standard.

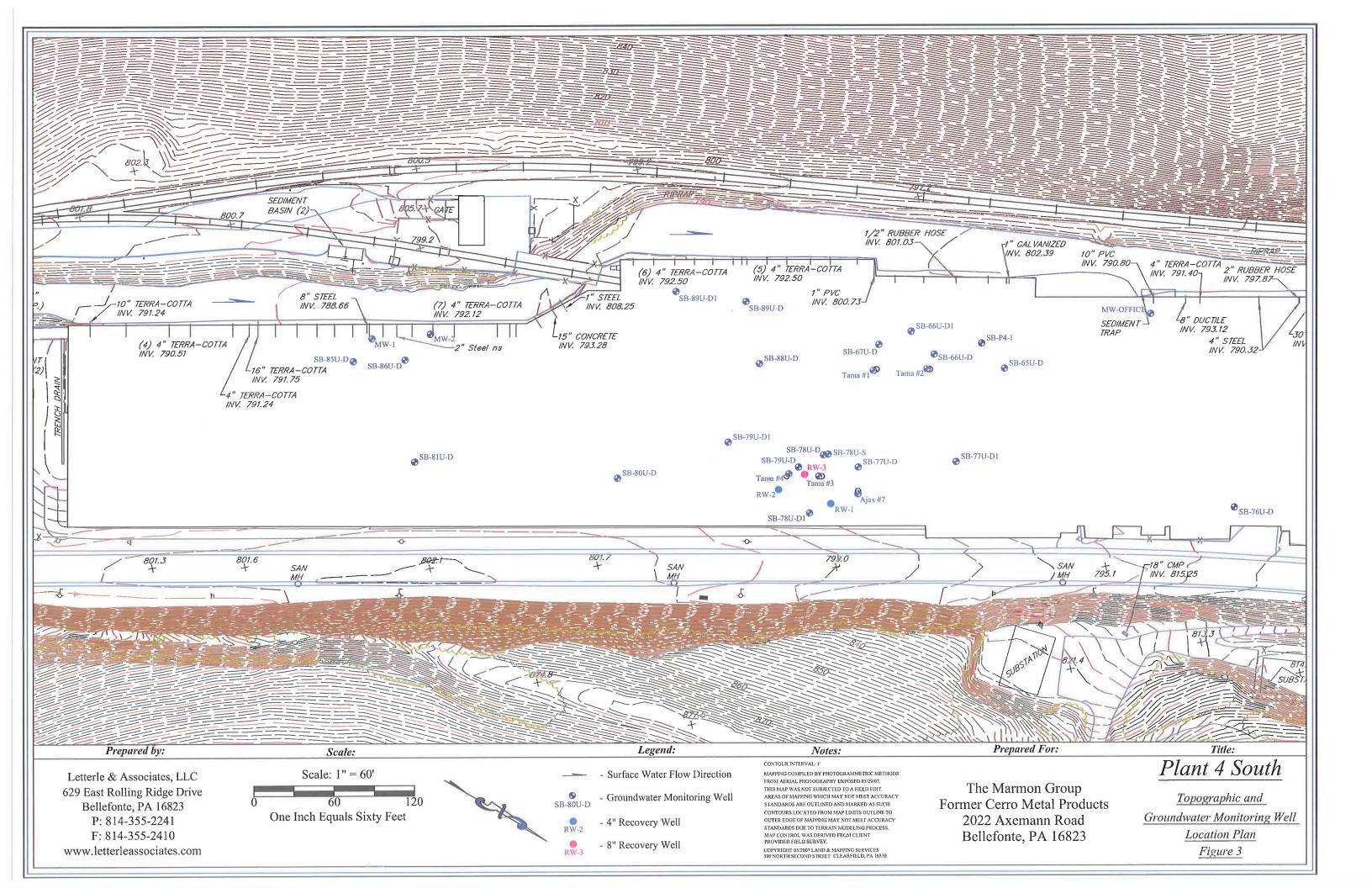
8.0 REFERNCES

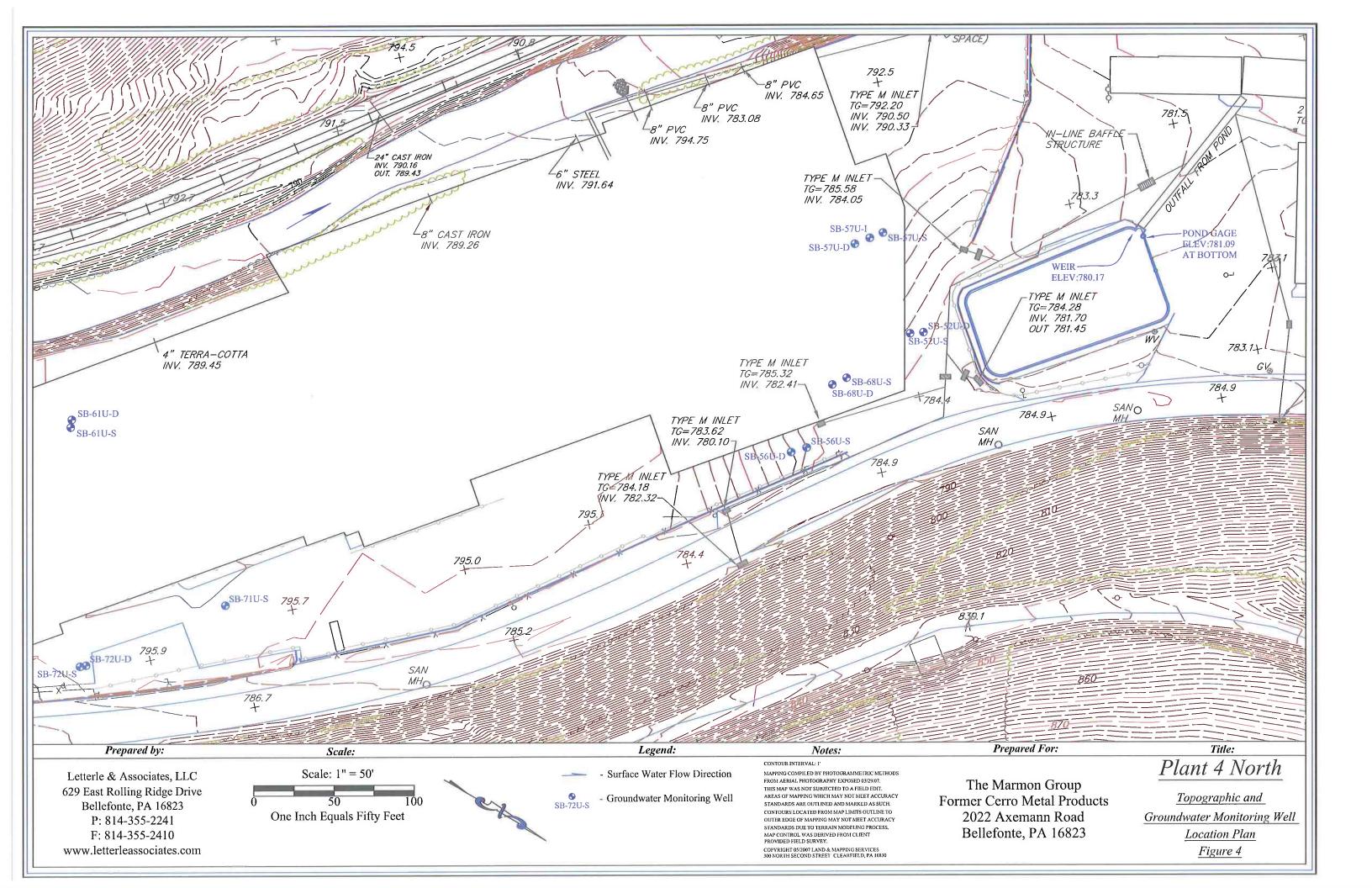
- Chambers, 2010. Volume I of II, Remedial Investigation Report, Former Cerro Metal Products Bellefonte Facility, Spring Township, Centre County, Pennsylvania, PADEP Facility ID #14-17981, Chambers Environmental Group, Inc., March 2010.
- PA Code, 2001a. Pennsylvania Code, Title 25, Environmental Protection, Pennsylvania Department of Environmental Protection, Chapter 245, Administration of the Storage Tank and Spill Prevention Program. December 1, 2001.
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- PADEP, 1995. The Land Recycling Program, Land Recycling and Environmental Remediation Standards Act, Act 2. May 19, 1995.
- PADEP, 2002. Pennsylvania Department of Environmental Protection. <u>Pennsylvania</u> <u>Land Recycling Program Technical Guidance Manual, V.1.</u> May 2002.
- PADEP, 2004. Land Recycling Program, <u>Technical Guidance Manual, Vapor Intrusion</u> <u>into Buildings from Groundwater and Soils Under the Act 2 Statewide Health</u> <u>Standard</u>. January 24, 2004.
- Puls, R.W. and M.J. Barcelona, 1996. <u>USEPA Ground Water Issue--Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures</u>. EPA Document 540/S-95/504.

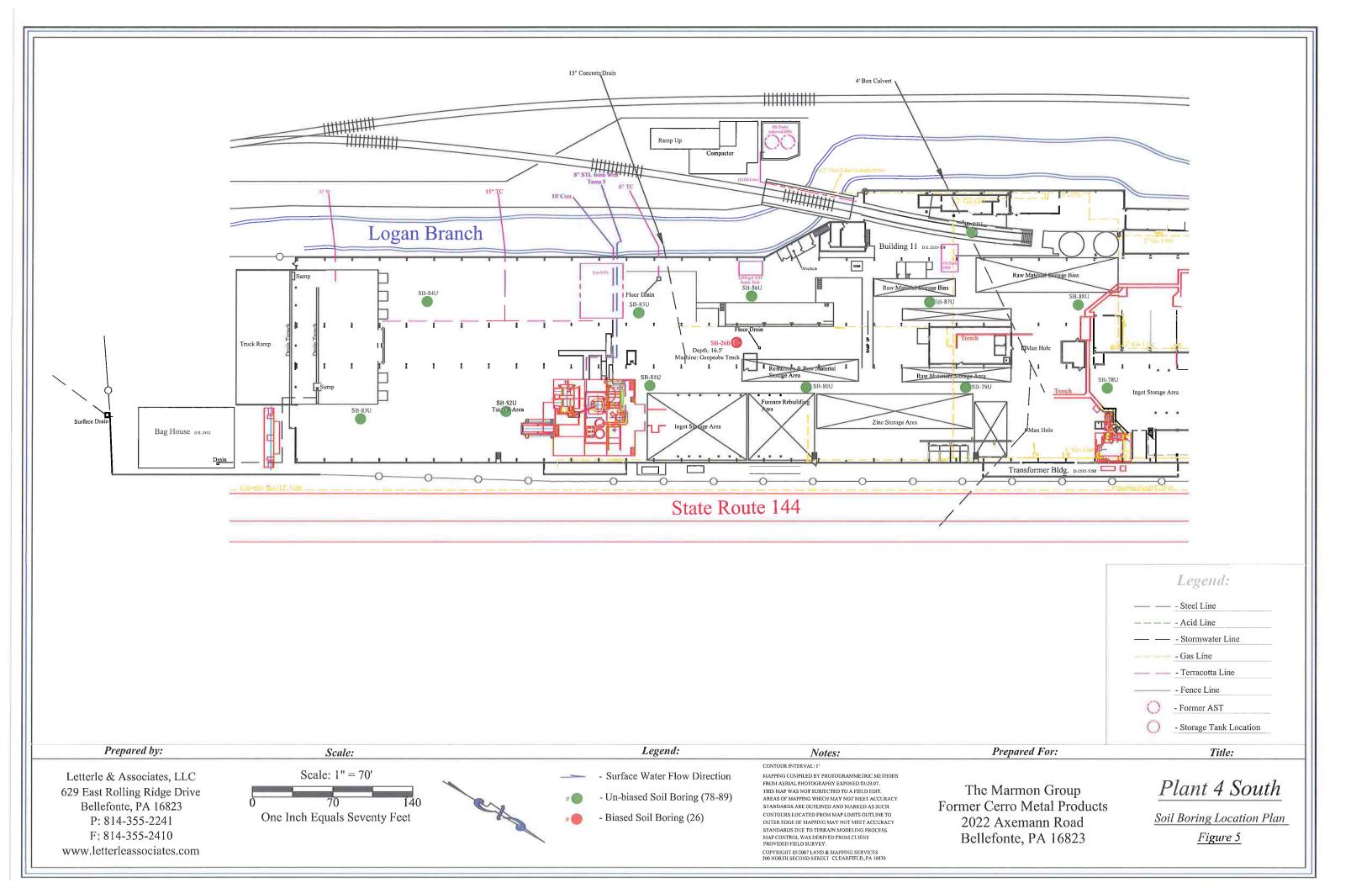


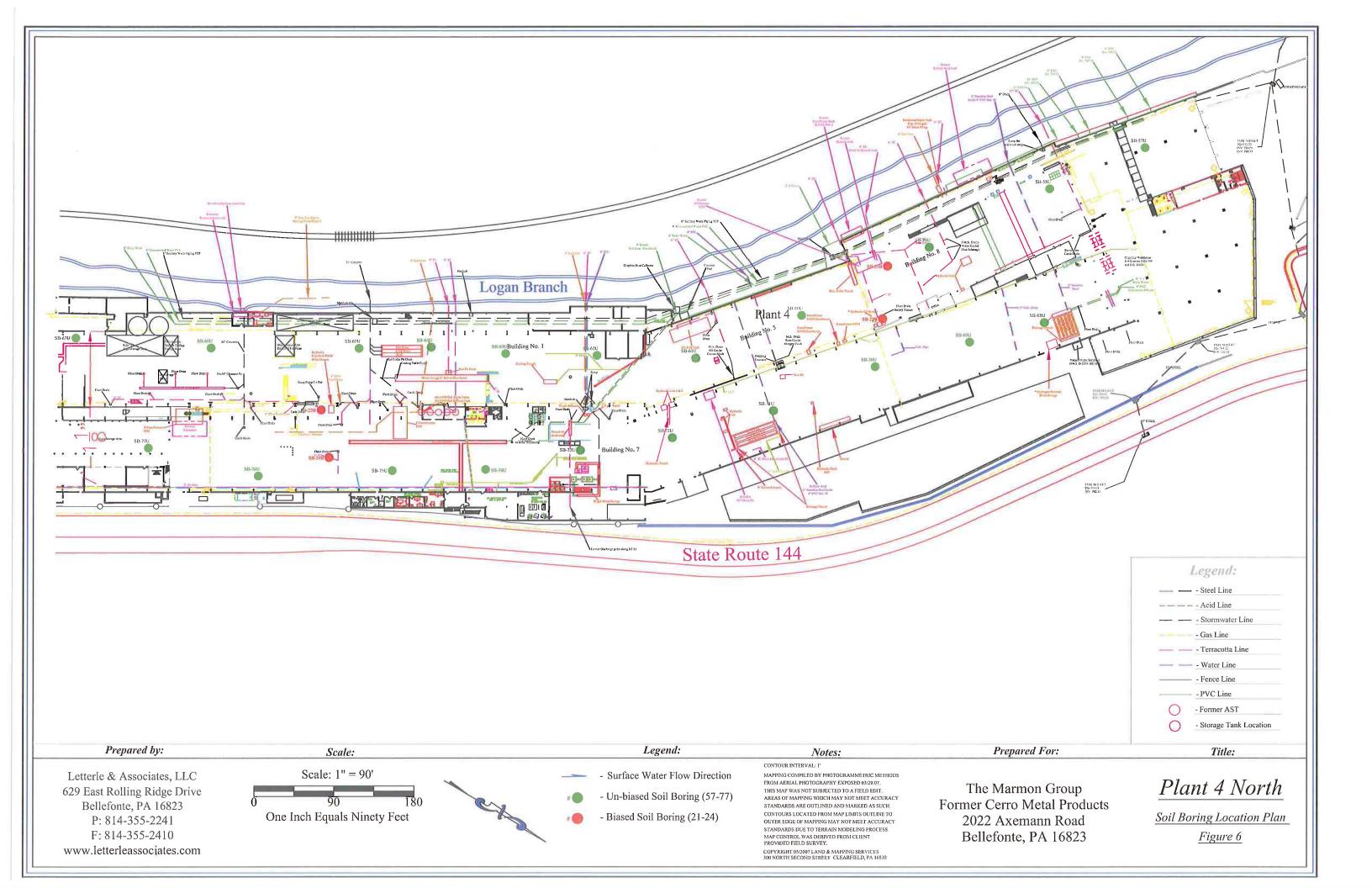
Prepared For:	Project Information:	Prepared By:
The Marmon Group Former Cerro Metal Products 2022 Axemann Road Bellefonte, Pennsylvania 16823	Project Manager: Matthew C. Whitman Project Geologist: Steven J. Treschow, P.G.	Letterle & Associates, LLC
Title:	Scale (feet):	629 East Rolling Ridge Drive Bellefonte, PA 16823
Figure 1 Site Location Map	Scale: 1" = 2000' 0 2000 4000	P: 814-355-2241 F: 814-355-2410 www.letterleassociates.com

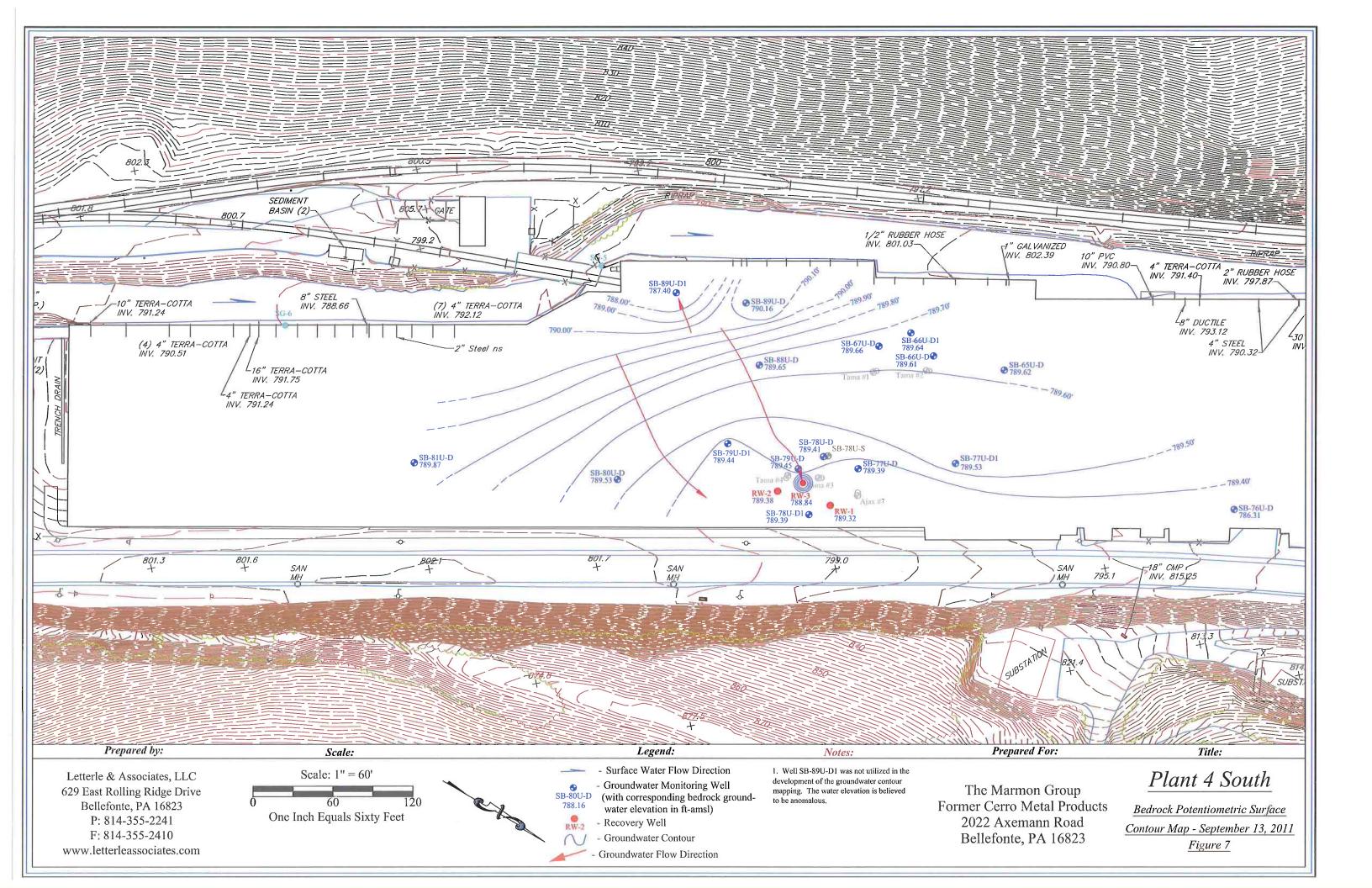


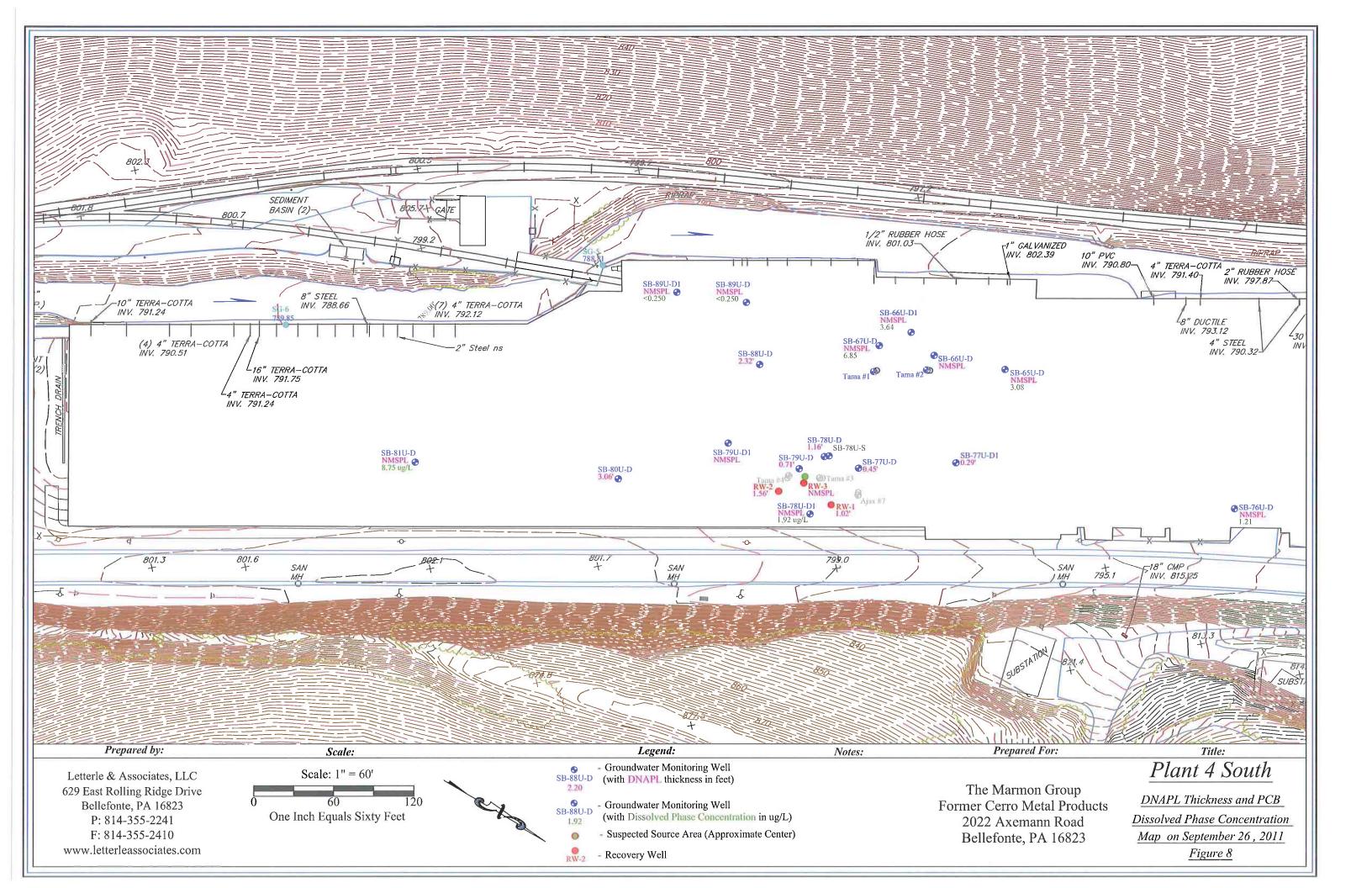












Soil Boring Log: SB-22B

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

	on Lo	gger. Steve Levitsky, or doo		-		L VOO Consentration	T
		SUBSURFACE PROFILE	SA	MPLI	=== ==== =====	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0- 1- 2- 3- 3- 5- 	ار برا برا برا برا برا برا برا برا برا ب	Ground Surface Concrete Slag Copper slag; 20% iron slag Slag Gley 1 6/5G; 30% 10YR5/3 loam Slag Interpretation; REFUSAL at 5,0'			29"		Metals, VOCs, TPH, and PCBs

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-23B

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE	SA	MPLI	-	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-	098300	Ground Surface		-			
1-		Concrete Solid concrete and dust/particles				5	
3-1	1/65/1/65//65//0	Slag Gley 1 8/10GY Copper slag; 20% iron slag; 20% Gley 1 8/10Y loam		L L	28"		Metals, VOCs, TPH, and PCBs
5-	12/1	Slag		П			
6	ا مراده می این مراده می این میرادی میراد میرادی این این این این این این این این این ای	Slag Iron slag		G	48"	1	
9-	1/2/20	Slag Interpretation					
11	1/2/1/2/	Slag Copper slag; 20% Gley 1 6/10GY loam		ħ,		5	
12-	نام اردارد. ایرار دارد در				50"		
14-		Slag Iron slag; 40% Gley 1 5/10Y copper slag; REFUSAL at 14.0'					

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Datum: Local

Drilled by: Bassett Environmental Associates

Sheet: 1 of 1

Hole Size: 2 Inch

Soil Boring Log: SB-24B

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

Depth	Symbol	SUBSURFACE PROFILE Description		MPL		VOC Concentration PID Meter 2020	
	Symbol	Description	oer		>		
0-2			Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
1-		Ground Surface Concrete Solid concrete and dust/particles Sand Gley N6; 40% gravel Sand Interpretation			20"	1 / Strong Odor	Matale VOCe TPH
3	(00 to 50 to	Gravel and Sand 7.5YR6/4; medium sand; 40% gravel Gravel and Sand Gley N7 and N6; 60% gravel; REFUSAL at 5.5'		G	16"	0 / Strong ⊕dor	Metals, VOCs, TPH, and PCBs

Drill Method: Portable Geoprobe

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-25B

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soll Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

3	OII LO	gger: Bill Hollman, F.G.			,		
		SUBSURFACE PROFILE	SA	MPLI	201 201	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface					
0-		Concrete					
1-	14 14 14 14 14 14 14 14 14 14 14 14 14 1	Slag 10YR5/4; some clay and dolomite gravel; (1.33 to 2.5' Interpretation)			10"	3	
2-	12/1					1	Metals, VOCs, TPH,
3-3-4-5-5-	12/10	Augured, no split spoon per client					and PCBs
6		Silt Loam 10YR5/4; fill material Augured due to spoon refusal at 8.42'		11.11	3"	4	

Drill Method: ATV Auger Rig

. All v Augor rug

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-25B

Project No: 07-051596

Project: Plant 4

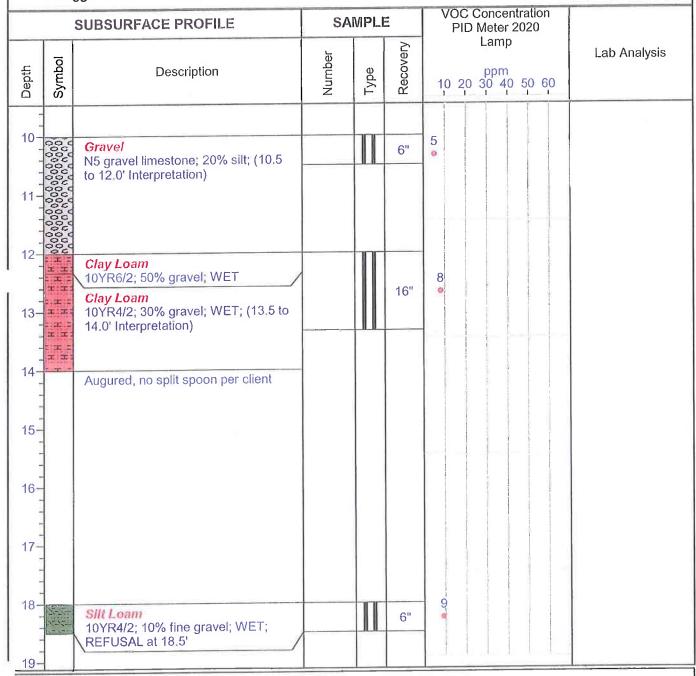
Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: ATV Auger Rig

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-26B

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

		SAMPLE			VOC Concentration	
	SUBSURFACE PROFILE	SA	IVIPLE		PID Meter 2020 Lamp	
Depth	Description	Number	Туре	Recovery	ppm 10 20 30 40 50 60	Lab Analysis
0-10932	Ground Surface					
-	Concrete					
1 – 30 1 – 30	Gravel and Sand some iron slag					
	Silty Clay Loam 5Y5/2			34"	3	
2-	Slag Iron slag; 40% small to medium gravel					Metals, VOCs, TPH, and PCBs
3-	Slag Interpretation					e
5- 6- 7	Sandy Loam Gley 4N Sand Gley 8N; 20% gravel fragments Gravel and Sand Black Gravel and Sand Gley 5N Gravel and Sand Gley 8N; 40% slag material Slag Gley 6N; 30% gravel			38"	2	

Drill Method: Truck Geoprobe

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-26B

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLI		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
9-	1/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2	Slag Interpretation					
10-	2 C C C C C C C C C	Sandy Loam 7.5YR6/2; 30% gravel; moist Sandy Loam		n		0	
12-		7/5YR4/2; fine sand; moist Sandstone 7.5YR5/2; fragments Sandy Loam 7.5YR5/4; fine sand; 40% gravel; WET		Ü	34"		
13-		Sandy Loam Interpretation					
15-	Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α	Gravel and Sand 7.5YR5/3; "soupy" saturated-WET Sandstone 7.5YR5/3; weathered bedrock;		G	20"	0	
17-		REFUSAL at 16,5'				Transaction of the Control of the Co	

Drill Method: Truck Geoprobe

Drill Date: 07/21/07

...

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-57U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

	<i>on</i> 20,	gger: Steve Levilsky, CF330				VOC Concentration	
		SUBSURFACE PROFILE	SA	MPL	1	PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface				4 1 1 1 1	
1-		Concrete 2.0' solid concrete, 0.67 pulverized dust and gravel					
3-	1/4	Slag Copper slag; Gley1 4/10GY to 4/5G;			18"	11	Metals, VOCs, TPH, and PCBs
4-	12/1	(3.67 to 4.0' Interpretation)					
5-	1/2/1/2/	Slag Copper slag; Gley1 7/5GY			24"	4	
6-		Loam Black; 60% gravel Loam			13"	0	
8-		Black; 70% gravel Sandstone 10YR8/1; Fragments			8"	4	
9-	15.10	Loam Black; 50% copper slag - Gley 1 3/5G; (7.08 to 8.0' Interpretation)					
10- 11-	15-14	Loam 10YR5/3; 20% copper slag - Gley 1 8/5G			5"		
12-	1/2/1/	Slag Copper slag - Gley 1 8/5G Slag		П	5"	0	
13-	1/2/1/2/	Copper slag - Gley 2 5/5BG; extremely hard drilling, augured to 10.0'					
14- 15-		Augured			8"	0	

Drill Method: Hollow Stem Auger

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-57U

Project No: 07-051596

Project: Plant 4

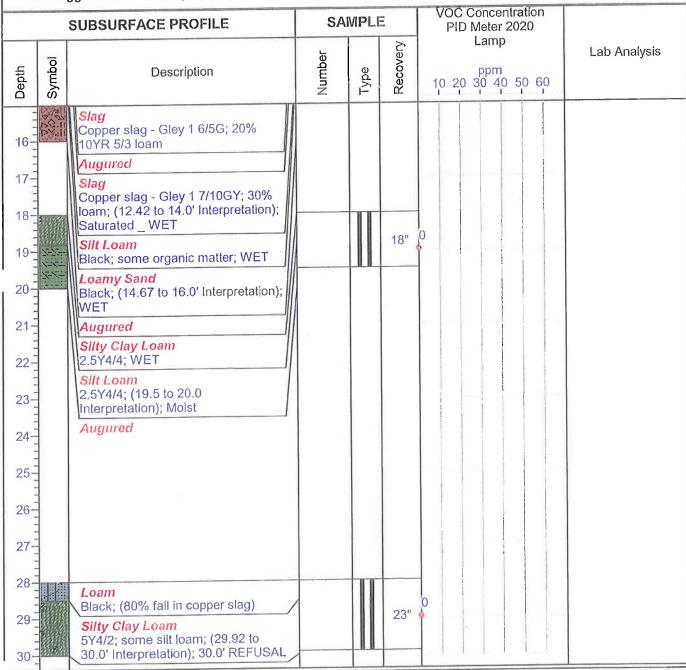
Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: Hollow Stem Auger

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-58U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Sc	oil Lo	gger: Matthew C. Whitman					
		SUBSURFACE PROFILE	SA	WPLI	=4	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-	PESOT NO	Ground Surface					
1-		Concrete pulverized dust and gravel fragments Slag Iron slag; 30% gravel; silt to fine sand material - 2.5Y4/1; (1.75 to		G	21"	2	Metals, VOCs, TPH, and PCBs
3-	12 12 1 2 2 1 1 2 2 1 1 1 1 1 1 1 1 1 1	5.0' Interpretation)					and r obs
5- 5- 6-	1 2/1/2/	Slag Copper slag; 40% gravel fragments; silt and sand Gley 6N		֓֞֞֜֜֞֜֜֞֜֜֟֓֓֓֓֓֟֜֜֟֓֓֓֟֟֓֓֓֟		2	
7-	12/1/20	Silt Loam Black with 2.5YR4/6 mottling Slag Copper slag; 60% gravel fragments Loamy Sand			43"		
9-	1 2 / 6 5 /	Gley 6/5G Slag Copper slag; (8.58 to 10.0' Interpretation)					
10-	1/00/00/00/00	Slag Copper slag (60%); Gley 1 6/10GY; 30% iron slag Gley 1 3/5GY		A			
13-		Loam Black; 35% copper slag; Moistwater at approx. 14.0' (14.0 to 15.0' Interpretation)			48"	1	

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-58U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
14-				G			
15- 16-	11/2/1/2	Slag Iron slag - Gley 2 2.5/10G; 15% 10YR5/2 loam		ו ה			
17-	100/100	Slag Iron slag - Black			42"	6	
18-	y	Sandy Clay Loam 10YR5/4; Saturated WET; (18.5 to 20.0' Interpretation)					pr
21-	1/40/100/100/	Slag Copper and iron slag; Gley 5N; 40% gravel				6	
23-	1 / 2 2 / / 2	Sand and Gravel Black; small gravel and large sand			60"		
25-	014	particles; Saturated - WET Silty Clay Loam 7.5YR4/6 Sandy Loam 7.5YR4/4; Saturated - WET		G	21"	0	
27-		Sandstone 7.5YR5/4; weathered bedrock; REFUSAL at 26.75'					

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-59U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE		SA	MPL		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface Concrete 2.0' solid concrete					
3-		Slag Black Iron slag - 70%; remaining Gley 1 5/10GY copper slag		G	28"	3	Metals, VOCs, TPH, and PCBs
4-		Loam 10YR5/3; 20% iron slag; bronze flakes present; (4.33 to 5.0' Interpretation) Concrete					
6-	1	Gley 1 8/N concrete dust			39"	0	
9-	77/20/20/20/20/20	Black iron slag; (8.25 to 10.0' Interpretation)					
11-	60 51/60 1/60/60 60 51/60 51/60 1/60 1/60 1/60 1/60 1/60 1/60 1/60	Concrete Dust; possible fall in Slag Copper slag; 40% black sand; (11.5 to 15.0' Interpretation)		G	18"	0	Approximation of

Drill Method: Geoprobe

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-59U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soll Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			WPL	ma) Raj coal	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
13- 14- 15- 16- 17- 18- 20- 21-	1/201/4501/46 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	Slag Copper slag Sand and Gravel Black; 70% sand; WET Silt Loam Gley 1 4/5GY; (17.08 to 20.0' Interpretation); moist Slag Copper slag; Gley 1 7/10GY; 40% loam 10YR5/3		G	25"		
22-		Sandy Clay Loam 5YR4/6; 10% rock fragment Sandy Clay Loam Interpretation; REFUSAL at 23.4'					

Drill Method: Geoprobe

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-60U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLI	Ξ	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0- 1- 2-	1657/19 10 50 10 10 10 10 10 10 10 10 10 10 10 10 10	Ground Surface Concrete Concrete chips and dust Slag Iron slag Slag Copper slag; Gley 1 4/10GY; 40% Ioam 10YR5/3 Wood Chica		0	30"	0	Metals, VOCs, TPH, and PCBs
3-	این مرابی ترابی ترابی مرابی مرابی درا این راین این این این این این این این این این	Chips Slag Copper slag; Gley 1 6/5G; very little fines Slag Interpretation; Copper slag			9		
6-	10 et / 6	Concrete Chips and dust; possible fall in Slag Copper slag; Gley 1 6/5G; very little fines; Saturated - WET Slag Iron slag; black			29"	0	
8-		Slag Interpretation; REFUSAL at 7.8'					

Drill Method: Geoprobe

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-61U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

So	il Lo	gger: Steve Levitsky, CPSSc				Dollo on to	
		SUBSURFACE PROFILE	SA	MPLI		VOC Concentration PID Meter 2020 Lamp	
Depth	Symbol	Description	Number	Туре	Recovery	ppm 10 20 30 40 50 60	Lab Analysis
0-	0933(39)	Ground Surface					-
i -		Concrete Concrete chips and dust		B			
1-		Loam 10YR2/2; fill			27"		
	12/1	Slag Copper slag; Gley 1 7/10GY; 20%				0	
2-	12/1	iron slag; very little fines					Metals, VOCs, TPH,
	12/2	Slag Interpretation					and PCBs
3-	1/200	interpretation +					
1	12/2/						
4-	15/2						
	15/2						
5-	44	Slag		$\frac{1}{1}$		-	
4	15/2/2	Copper slag; 10% loam 10YR5/3; Saturated - WET					
6-	100/1	Catarated - WE1		וטן	22"	0	
-	10 11						
7-	47	Slag					
-		Interpretation; REFUSAL at 7.0'					
8-							
9-							

Drill Method: Geoprobe

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-62U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Soil Logger: Bill Hoffman, P.G.							
SUBSURFACE PROFILE			SAMPLE			VOC Concentration PID Meter 2020 Lamp	
Depth	Symbol	Description	Number	Type	Recovery	ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface Concrete					
2-	Jac 16 1 10	Slag Black Iron slag; 40% gravel; (2.58 to 3.0' Interpretation)			13"	0	Metals, VOCs, TPH, and PCBs
3-	600/600/600/600/600/600/600/600/600/600	Slag N6; fill - gravel 90%; (4.0 to 5.0' Interpretation)			12"		
5- 6-	12 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1	Slag N6; fill - gravel 90%; (5.04 to 7.0' Interpretation)					
7- 8-	17 17 17 17 17 17 17 17 17 17 17 17 17 1	Concrete 2nd slab Slag 5YR4/1; sandy loam encountered			14"	0	
9-	10/1	5Y2/1; 50% gravel/50% sand and silt; (8.67 to 9.0' Interpretation) No Return					
11-	1/2/1/				7"	4	

Drill Method: ATV Auger

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-62U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	,,, <u>,,</u>	gger: Bill Hoffman, P.G.				VOC Concentration	
		SUBSURFACE PROFILE	SAI	MPLE		PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
12-	1/2/1/20/1/2	Slag 10YR2/2; 75% gravel / 25% sand and silt size material; (11.58 to 13.0' Interpretation); WET					
13-	ا جرا ارتدا ارتدا ا جرا ارتدا المردا	Slag 10YR2/2; (13.67 to 15.0' Interpretation)			8"		
15-	12/1/2/	Slag 10YR2/2 Organic Material 10YR2/2			18"	2	
17-		Clay 10YR4/2; slightly silty; (16.5 to 17.0' Interpretation) Clay 10YR4/2; slightly silty			16"	0	,
19-	000000	Organic Material 10YR2/2 Clay 10YR4/2; slightly silty; (18.33 to 19.0' Interpretation)			6"	0	
20-	000000000000000000000000000000000000000	Gravels 10YR4/2; 30% clayey silt; (19.5 to 20.0' Interpretation) Silty Clay			6"	-0 •	
22-		Dolomite 10YR7/4; weathered sandy dolomite; (21.5 to 22.0' Interpretation); REFUSAL at 22.0'					

Drill Method: ATV Auger

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-63U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Soil Logger: Bill Hoffman, P.G.									
	SUBSURFACE PROFILE					VOC Concentration PID Meter 2020 Lamp			
Depth	Symbol	Description	Number	Type	Recovery	ppm 10 20 30 40 50 60	Lab Analysis		
0-		Ground Surface Concrete				11	07		
2 3 4 5 6	1/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2	Slag 5YR4/1; with sandy loam Slag N5/N6; with sandy loam; (2.0 to 3.0' Interpretation) Augured, no split spoon per client			12"	8	Metals, VOCs, TPH, and PCBs		
9-	1/2/2/20	Slag 5YR4/1; with silt loam - 10% gravel; (8.5 to 10.0' Interpretation)			6"	3			
11-	1/2/1/2/	Slag 5YR4/1; (10.17 to 12.0' Interpretation)' WET	1						
12- 13- 14- 15- 16-		Augured, no split spoon per client							

Drill Method: ATV Auger

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-63U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soll Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
17- 18- 19- 20- 21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32-		Silty Clay 10YR4/2; some rounded rock fragments; (19.83 to 21.0' Interpretation) Silty Clay 10YR4/3; 20% rock fragments; (21.5 to 23.0' Interpretation) Silty Clay 10YR4/3 Dolomite 5YR8/4 weathered dolomite with 10YR6/6 clay and silt; (24.0 to 25.0' Interpretation); WET Dolomite 5YR8/4 weathered dolomite with 10YR6/6 clay and silt; WET Sandy Clay 10YR6/6; with weathered rock; (25.67 to 27.0' Interpretation); WET Sandy Clay 10YR7/4 to 10YR5/4; with weathered rock; (28.33 to 29.0' Interpretation); WET			10" 6" 12" 8" 16"		31

Drill Method: ATV Auger

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-64U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

So	oil Lo	gger: Bill Hoffman, P.G.				VOC Consentration	
		SUBSURFACE PROFILE	SA	MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0- 1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13-	1/25/25/2 2/12/25/2	Ground Surface Concrete Slag 5B7/1; some silt loam and 10% 5GY2/1 gravel; (3.83 to 4.5' Interpretation) Augured, no split spoon per client Concrete 2nd floor Slag 5B7/1; Spoon Refusal at 9.0' Augured Slag N7; some silt loam and minor gravel; (10,83 to 12.0' Interpretation); WET Augured, no split spoon per client			16" 12"		Metals, VOCs, TPH, and PCBs
14- 15- 16-							

Drill Method: ATV Auger

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-64U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soll Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Sc	oll Lo	gger: Bill Hoffman, P.G.				. 215 6 6 1 1/- 1	
		SUBSURFACE PROFILE	SA	MPL		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Damp ppm 10 20 30 40 50 60	Lab Analysis
17- 18- 19- 20- 21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32-		Sand and Gravel 10YR4/2; 50% fine gravel; WET Sand and Gravel 10YR4/2; WET Sandstone 10YR6/2; weathered fine grained sand stone and clayey sand; WET; (21.67 to 22.0' Interpretation) Sandy Clay 5YR6/2; with weathered sandstone; WET; REFUSAL at 23.0'			12" 18" 12"		

Drill Method: ATV Auger

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-65U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

50	oll Lo	gger: Matthew C. Whitman				VOC Concentration	
	SUBSURFACE PROFILE			WPLE		PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Damp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface Concrete pulverized dust and gravel fragments			28"		
2-	000000	Gravel N7; medium to large gravel Ash Black Ash Interpretation				86	Metals, VOCs, TPH, and PCBs
3-		Ash Black; REFUSAL at 4.33'		G	4"	-O	
5-	-						

Drill Method: Portable Geoprobe

Datum: Local

Drill Date: 07/22/07

Drilled by: Bassett Environmental Associates

Hole Size: 2 Inch

Soil Boring Log: SB-66U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C, Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE	proj	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-	131	Ground Surface Concrete N7; pulverized dust and 40% gravel fragments		G	13"		
3-	00000000000000000000000000000000000000	Concrete Interpretation; gravel and pulverized dust					Metals, VOCs, TPH, and PCBs
5- 6- 7- 8-	000000000000000000000000000000000000000	Concrete N7; 70% chips and gravel; sand Sand 10YR4/3; fine to medium Sandy Loam 10YR3/2 Slag Copper slag; WET Sandy Loam 10YR3/2; some gravel		S	40"	5	

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-66U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
10-	000000000000000000000000000000000000000	Sandy Loam Interpretation Gravel Fall in material of gravel and concrete					
12-		Gravel and Sand 7.5YR4/1; some copper slag; WET Sand 7.5YR6/2; medium grain; 30% dolomite chips Silt Loam 10YR4/1; very moist			58"	1	
14- 15- 16- 17-	000000000000000000000000000000000000000	Silt Loam Interpretation Gravel Fall in material of gravel and concrete Sand 10YR3/2; 30% small to medium gravel; WET Dolomite 70% gravel dolomite chips; medium sand; WET; REFUSAL at 18.0'			36"	7	

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-67U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soll Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLI	#4 #4 #4	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface Concrete N7; pulverized dust and gravel fragments Ash		G	20"	0	
3-	1/65/65/65/65/65/6	Black; fill Sandy Loam 7.5YR3/3; very moist Slag Copper slag Slag					Metals, VOCs, TPH, and PCBs
5- 6- 7- 8- 9-		Interpretation Gravel Fall in; concrete dust and chips Gravel and Sand Black; fill material Silt Loam 10YR4/3; 30% gravel fragments; WET Silt Loam Interpretation		G	20"	0	
11-	7-7- 7-7- 7-7- 7-7- 7-7- 7-7- 7-7- 7-7	Gravel and Sand WET Silt Loam 10YR3/1; moist Sand Very fine; WET Silt Loam 10YR3/1; some organic matter	/	Ŋ	50"	0	
15-	2002	Silt Loam Interpretation	_	G			

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-67U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

30	SUBSURFACE PROFILE			MPLI		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
16 17- 18-	全国的 100mm 1	Gravel and Sand 10YR4/2; dolomite gravel; WET Silt Loam 7.5YR4/1; some organic matter; WET Gravel and Sand 7.5YR2/1; WET Gravel and Sand Interpretation Silt Loam 7.5YR4/1; WET Gravel and Sand 10YR6/2; large grave with medium to large sand particles Sand 7.5YR5/3; medium to fine particles, small gravel			58"		
26- 27- 28- 29-	До До До До До До	Sand Interpretation Sand 7.5YR4/3; medium grains; WET Gravel small to medium gravel; WET Gravel and Sand Medium gravel Sand Fine; packed hard; moist; REFUSAL at 29.0'			48"	0	

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-68U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Sc	oil Log	gger: Matthew C. Whitman	-			VOC Concentration	
	SUBSURFACE PROFILE			MPLE		VOC Concentration PID Meter 2020 Lamp	
Depth	Symbol	Description	Number	Type	Recovery	ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface					
-		Concrete pulverized dust and gravel fragments; some iron slag Gley 8/10B		Д			
1-	10-14	Slag Black Iron slag; 30% gravel					
2-	1/2 1/5 1/2 1/2 1/2 1/2 1/2	Slag Copper slag; Gley 8/10B; 20% gravel			46"	0	Metals, VOCs, TPH,
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Slag Iron slag; Gley 7/10B					and PCBs
3-	1 / 10 1 / 10 10 10 10 10 10 10 10 10 10 10 10 10						
4-	12 / 12 / 12 / 12 / 12 / 12 / 12 / 12 /	Slag Interpretation; REFUSAL at 5.0'					
6-	-						

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-69U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-	1000 / 10	Ground Surface Concrete pulverized dust and gravel fragments; some iron slag Gley 8/10B Slag Iron slag; 30 to 60% gravel frags; Gley 4N to 8N		6	17"	0	
2-	1 / 45 1 / 45 5 / 45 5 / 45 5 / 45 5 5 / 45 5 5 / 45 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6 5 5 6	Slag Interpretation; REFUSAL at 2.5'					Metals, VOCs, TPH, and PCBs
5-							

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-69U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

VOC Concentration SAMPLE SUBSURFACE PROFILE PID Meter 2020 Lamp Recovery Lab Analysis Number ppm 10 20 30 40 50 60 Depth Description Ground Surface Concrete Slag 6" Iron slag; 30 to 60% gravel frags; Gley 1 4/N to 8/N; (1.0' to 2.5' Interpretation) Metals, VOCs, TPH, and PCBs 2-Dolomite Confirmed bedrock by drilling to 8.0'

Drill Method: HSA

Drill Date: 11/21/08

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-70U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Description Description Ground Surface Concrete Slag Copper slag; 30 to 60% gravel frags; Gley 1 4/N to 8/N; (Interpretation from 0.67' to 2.0') Description Description			SUBSURFACE PROFILE	SA	MPLE	9	VOC Concentration PID Meter 2020	
Concrete Slag Copper slag; 30 to 60% gravel frags; Gley 1 4/N to 8/N; (Interpretation from 0.67' to 2.0') Dolomite Gley 1 5/N and Gley 8 5/PB; Confirmed bedrock by drilling to 8.0'	Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
5	1- 2- 3- 4- 5- 6-		Concrete Slag Copper slag; 30 to 60% gravel frags; Gley 1 4/N to 8/N; (Interpretation from 0.67' to 2.0') Dolomite Gley 1 5/N and Gley 8 5/PB;			2"		Metals, VOCs, TPH, and PCBs

Drill Method: HSA

Drill Date: 11/21/08

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-71U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE	SA	MPLE	201 201	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface		11.11			
1-	ا ایم ایم ایم کاری کاری کاری کاری کاری کاری کاری کاری	Concrete Slag Copper slag; 30 to 60% gravel frags; Gley 1 5/N to Gley 2 8 5/PB; (Interpretation from 0.67' to 2.0')			2"	0	
2-	المرابي المرابي المرابي	(interpretation from 0.07 to 2.0)				0	Metals, VOCs, TPH, and PCBs
5- 5- 6- 8-		Dolomite Gley 1 5/N and Gley 2 8 5/PB; Confirmed bedrock by drilling to 7.5'					

Drill Method: HSA

Drill Date: 11/21/08

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-72U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	JII 2.0	gger: Matthew C. Whitman	T .			VOC Concentration	i
		SUBSURFACE PROFILE	SA	MPLE		PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0- 1- 2- 3- 4- 5- 6-	ار ایرورا کرد در ایران ار در ار ایرورا کرد در ارد در ا در ایران در ایران در ایران در ایران در ایران در ارد در	Ground Surface Concrete Slag Gley N7 to N5; fill with gravel and sand; ash Slag Interpretation		G	33"	11	Metals, VOCs, TPH, and PCBs
8- 9- 10- 11- 12- 13-		Gravel and Sand Gley N7; fill material Gravel and Sand Gley N4; fill material Gravel and Sand Gley N7; fill material Slag Copper slag Gravel and Sand Gley N7 to N6; fill material Gravel and Sand Black Gravel and Sand Interpretation; REFUSAL at 12.5'			49"	6	

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-73U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Soil Lo	gger: Steve Levitsky, CPSSc				VOC Concentration	
	SUBSURFACE PROFILE	SA	MPLE		PID Meter 2020 Lamp	
Depth	Description	Number	Туре	Recovery	ppm 10 20 30 40 50 60	Lab Analysis
	Ground Surface					
0-	Concrete					
2-	Concrete Chips and dust			12" 12"	0	Metals, VOCs, TPH, and PCBs
5-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	Augured, no split spoon per client					
10 11 12 13 14 15 16 17 17 16 17 17 17 17 17 17 17 17 17 17 17 17 17	Silt Loam 10YR8/1; 5% Iron slag; moist Silt Loam Interpretation Loam 10YR8/1; with 10% rock; Saturated - WET Loam Interpretation Augured, no split spoon per client			20"		

Drill Method: Auger Rig

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-73U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

		SUBSURFACE PROFILE	SA	WPL	E	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
18- 19- 20- 21- 21- 22- 23- 24- 25- 26- 27- 28- 30- 31- 32- 33- 34- 35- 35-	2702	Gravel and Sand Gley 5/10Y; fine sand; WET Gravel and Sand Gley 4N; medium sand; moist; REFUSAL at 34,0'			12"	4	

Drill Method: Auger Rig

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-74U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

Sc	oil Log	ger: Matthew C. Whitman				VOC Concentration	
	9	SUBSURFACE PROFILE	SAI	VIPLE		PID Meter 2020 Lamp	
Depth	Symbol	Description	Number	Type	Recovery	ppm 10 20 30 40 50 60	Lab Analysis
		Ground Surface					
0-		Concrete					
1- 2-	96	Concrete Chips and dust; (2.33 to 3.0' Interpretation)			16"	5	Metals, VOCs, TPH, and PCBs
3- 4-	Ó6	Gravel and Sand Fill material; (4.17 to 5.0' Interpretation)			14"	0	
5-	3	Augured, no split spoon per client					
6- 7-	7						
8-	=						
10	=	Slag			7"	27	
11	125/125	Gley 7N to 4N; with concrete chips; (10.58 to 12.0 Interpretation)				-24.3 / Retroleum Odor	
12	- 2000	Gravel and Sand Gley 6N; moist Gravel and Sand	-		9"		
14	300	Black; moist; (12.75 to 14.0' Interpretation)			8"	25	
15	15/	Gravel and Sand Black; WET	/				-
			/				

Drill Method: Auger Rig

Drill Date: 07/21/07

Hole Size: 6 Inch

Sheet: 1 of 2

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-74U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE	SA	MPL	1	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
17 - 18 - 19 - 20 - 21 - 22 - 23 - 24 - 25 - 26 - 27 - 28 - 29 - 30 - 31 - 32 - 33 - 33 - 33 - 33 - 33 - 33		Sand Gley 3 10Y; WET; Dolomite chips at bottom; (31.25 to 32.0' Interpretation); REFUSAL at 32.0'			15"	26	

Drill Method: Auger Rig

Drill Date: 07/21/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-75U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

30	JII LU	gger: Bill Hollman, P.G.				VOC Concentration	
		SUBSURFACE PROFILE	SA	MPLI	=	PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface Concrete					
2-	为各名名名名名	Silt Loam 5YR6/1; mixed fill; 20% slag and rock gravel; (2.75 to 3.0' Interpretation)			21"	11	Metals, VOCs, TPH, and PCBs
3-	(21 (-1)	Augured, no split spoon per client					*
5-							
7-	ZZ-	Silt Loam 5YR5/2; 25% gravel, dolomite rock;			14"	14	
9-	-2.2 -2.2 -2.2 -2.2 -2.2 -2.2 -2.2 -2.2	(9.17 to 10.0' Interpretation) Augured, no split spoon per client;			14		
11-		REFUSAL at 10.5'					

Drill Method: ATV Auger Rig

Drill Date: 07/22/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-76U

Project No: 07-051596

Project: Plant 4

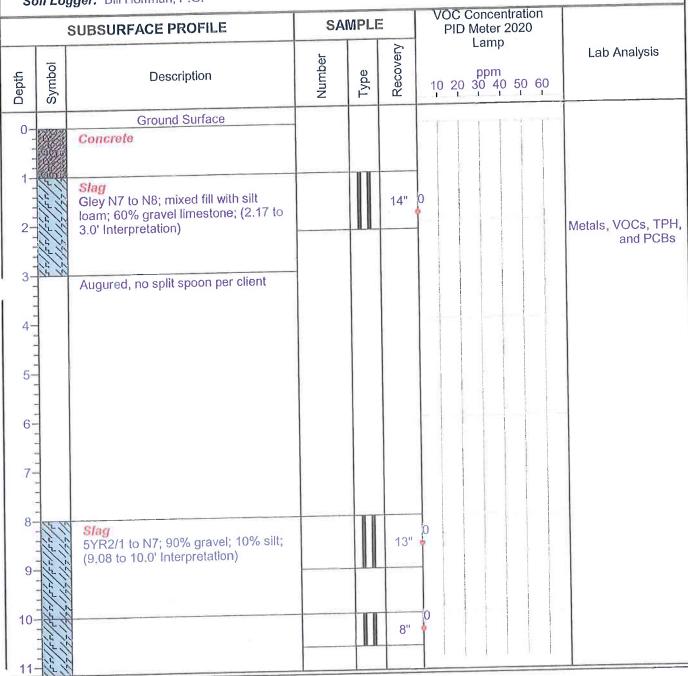
Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: ATV Auger Rig

Drill Date: 07/22/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-76U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
12-	1 4 6 4 6 4 6 4 6 6 6 6 6 6 6 6 6 6 6 6	Slag 5YR6/1; mixed fill - gravel, slag, 20% silty clay; moist; (10,67 to 12.0' Interpretation) Silt Loam 5YR4/1; 20% gravel size rock fragments; moist; (12.5 to 14.0' Interpretation)			6"	-0	
14-		Silt Loam 5YR4/1; moist Sandy Clay Loam 5YR4/1; 20% gravel; moist (14.67 to 16.0' Interpretation)			8"		
16-		Clay Loam 10YR5/4; 40% alluvial; (17.0 to 18.0' Interpretation); WET			12"		
19-		Augured, no split spoon per client					
21-		Sandy Clay Loam 10YR4/2; 20% rock fragment; WET; REFUSAL at 21.5'			12"		

Drill Method: ATV Auger Rig

Drill Date: 07/22/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-77U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE	SA	MPLI	=	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0	3 人名英格兰人名英格兰人名英格兰人名 中央 在野村 (1) (2) (2) (2) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	Ground Surface Concrete Silt Loam 7.5YR4/6; 10% slag; moist Silt Loam Interpretation Sandy Loam 7,5YR3/3; moist		G	15"	2	Metals, VOCs, TPH, and PCBs
6- 7- 8- 9- 10-		Ash Coal ash Sandy Loam 7.5YR4/4; fine; Saturated - WET Sandy Loam Interpretation Sandy Loam 7.5YR4/4; fine; Saturated - WET		G	36"		

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-77U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE				50) 50 50	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
12- 13- 14- 15- 16- 17-		Dolomite Sandy dolomite chips Sandy Clay Loam 10YR4/3; tight; moist Dolomite Sandy dolomite chips Sandy Loam 10YR4/2 Sandy Loam Interpretation Sandy Loam 10YR4/2; fine Sandy Loam 10YR4/2; 40% sandy dolomite chips; Saturated - WET Dolomite Sandy dolomite; 20% 10YR4/2 sandy loam; Saturated - WET		G	43"		
19-		Sandy Loam Interpretation Sandy Loam 10YR4/2; "Soup" - Saturated - WET; Sandy Dolomite at bottom of core; REFUSAL at 21.0'		G	12"	0	

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-78U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

30		gger: Maunew C. Whitman		_		VOC Concentration	
		SUBSURFACE PROFILE	SA	MPLE	-	PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
		Ground Surface					
0-	00	Concrete Gley 7N; 40% gravel Gravel	-				
1-	0000000	Gley 7N; Large gravel fragments Sandy Loam			42"		
	/-X-	Black		18	42	0	
2-		Silt Loam \7.5YR4/4					Metals, VOCs, TPH, and PCBs
1	/-/- /-/-	Dolomite	/				W
	- 74-4-7 - 24-24-1	Gravel fragments Silt Loam		$\Pi\Pi$			
3-	200	7.5YR4/4					-24
		Gravel and Sand		Ш			
4-		Gravel and Sand Interpretation					
5-	100			111	-		
	3897	Silt Loam 7.5YR4/4					
2 8		Concrete					
6-	20.00	Pulverized dust Silt Loam					
	- 72-72- 12-72-	10YR4/4					
	127			111	1		,
7	7-7				- Company		
1	- 22				51"		

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-78U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE		SA	MPLI	Ē	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
8		Silt Loam 7.5YR4/3; with 30% sandstone gravel; moist Gravel and Sand 7.5YR4/3; fine sand; Moist Sandy Loam Moist Sandy Loam Interpretation		G			
10-		Sandy Loam 7.5YR5/4; WET Dolomite Large gravel chips; WET		n	23"	0	
13-		Loam 10YR5/6; moist Loam Interpretation; REFUSAL at 14.2'					

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-79U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE		SA	WPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface Concrete Gley 7N; 40% gravel Silt Clay Loam 7.5YR4/5			12"	21.0	
1-		Concrete REFUSAL at 1.0'					

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-80U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

So	il Lo	gger: Matthew C. Whitman				Delleforite,	174 10020
SUBSURFACE PROFILE		SA	SAMPLE		VOC Concentration PID Meter 2020		
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
β 0- 1- 2- 3-	1/21/21/21/21/21/21/21/21/21/21/21/21/21	Ground Surface Concrete Slag Iron slag; 30% Gley 4N gravel Slag Copper slag; 60% Gley 4N gravel with Gley 7N sand Slag Interpretation; REFUSAL at 4.7'	Z		39"		Metals, VOCs, TPH, and PCBs
6	-						

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-81U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C, Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

Soil Logger: Matthew C. Whitman		T CAL	1/151 E		VOC Concentration		
	SUBSURFACE PROFILE		SA	SAMPLE		PID Meter 2020 Lamp	
Depth	Symbol	Description	Number	Type	Recovery	ppm 10 20 30 40 50 60	Lab Analysis
		Ground Surface					
0-	17	Concrete Slag					
1-	ار میرارد میرارد میرارد و ایرار ایراری ایراری ایراری	Gley 7N to 6N; 40% large gravel			20"	2	
2-	ار ایران میارید میارید میارید ار ایران میارید ایران	Slag Interpretation; REFUSAL at 4.5'					Metals, VOCs, TPH, and PCBs
3-	1/6 11/6 11/6 11/6 11/6 11/6 11/6						
5							

Drill Method: Geoprobe Track Rig

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-82U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Soil L	Soil Logger: Bill Hoffman, P.G.									
SUBSURFACE PROFILE		SAMPLE			VOC Concentration PID Meter 2020					
Depth	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis				
0- 1- 2- 3- 3- 3- 4- 7- 6- 7- 10-	N5; limestone fill Clay Loam 5YR4/1; 30% gravel size rock fragments; (3.5 to 4.0' Interpretation)			18"		Metals, VOCs, TPH, and PCBs				

Drill Method: Track Auger Rig

Drill Date: 07/22/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-83U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

_	SUBSURFACE PROFILE		SA	MPLI	ed ed	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-		Ground Surface Concrete Slag Iron slag; Black; 30% gravel Slag Interpretation		G	16"	4	Metals, VOCs, TPH, and PCBs
5- 6- 7- 8- 10-		Concrete Gley N7; concrete and gravel Sand Black Sandy Loam 10YR4/3; fine sand; moist Sandy Loam 10YR5/3; fine sand; moist Sandy Loam Interpretation Sand 10YR3/2; fine to small grains; 40% gravel		G	27"		

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-83U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

50		gger: Matthew C, Whitman	C A	WPLE		VOC Concentration	
	SUBSURFACE PROFILE		SAI	IVIE ILL		PID Meter 2020 Lamp	
Depth	Symbol	Description	Number	Туре	Recovery	ppm 10 20 30 40 50 60	Lab Analysis
12-		Sand 10YR5/4; 30 to 40% small gravel; moist		G	33"	2	
13-		Sand Interpretation					
16-	000	Sand 10YR3/2; fine to small grains; moist Gravel and Sand 10YR5/4; 70% gravel; WET Gravel			38"	0	
18- 19-	000000000000000000000000000000000000000	Small to medium gravel, tightly packed; WET Gravel Interpretation					
21-	7000	Sand Medium to small grained; WET Gravel and Sand 10YR7/4; 70% gravel; WET; REFUSAL at 21.83'		G	22"		
22							

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-84U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE	and ord	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
2-	5 4 / 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2 1	Ground Surface Concrete Gravel and Sand Black and Gley N4; fill material; 40% gravel Slag 40% gravel; medium to small sand Slag Interpretation		G	25"	1	Metals, VOCs, TPH, and PCBs
5- 6- 7-	2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.	Concrete Dust and chips; possible fall in material Silt Loam 10YR4/1; moist		G	32"		
9- 10- 11-		Silt Loam Interpretation Sand Fine to small grains; WET Gravel and Sand 10YR3/1; 40% gravel; WET Silt Loam 10YR4/2; moist		G	22"		

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-84U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			WPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
13-	2-7-	Silt Loam Interpretation					,
15-	700 700 700 700 700 700	Gravel and Sand 10YR4/2;WET Gravel and Sand				0	
18-	166 200 200 200 200 200 200 200 200 200 2	10YR4/2; 30% gravel; WET Sand 10YR4/2; WET			58"		
21-22-23-		Sand Interpretation Sand 10YR4/2; WET "soupy"; with gravel fragments		A	46"	0	
24-		Sand 10YR4/2; Moist; Hard packed; Medium sand particles; REFUSAL at 23.83'					

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-85U

Project No: 07-051596

Project: Plant 4

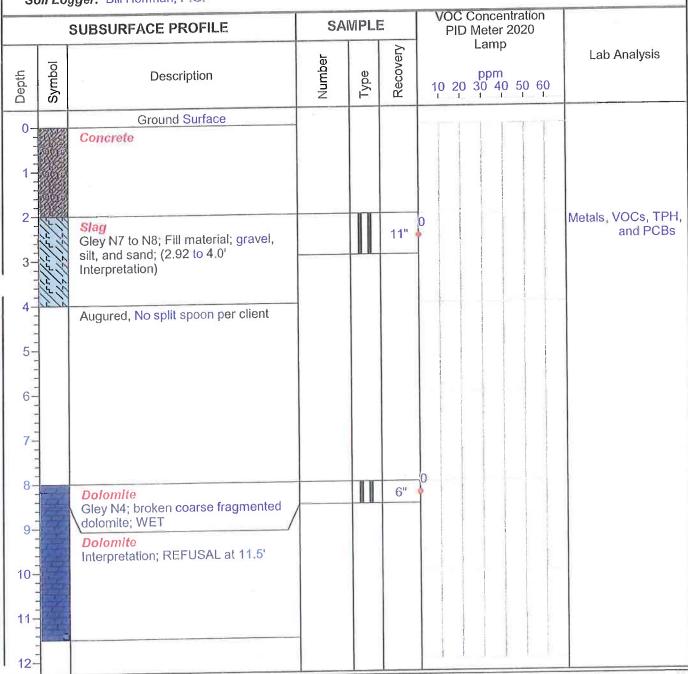
Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Bill Hoffman, P.G.



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: Track Auger Rig

Drill Date: 07/22/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-86U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE	SAI	MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0-	3	Ground Surface Concrete					
2-	000000000000000000000000000000000000000	Gravel Gley N7 to N6; Concrete fragments; fill gravel; (2.42 to 3.5' Interpretation)			11"	5	Metals, VOCs, TPH, and PCBs
4-	00,000,000,000	Gravel Gley N7; concrete fragments; dolomite fill			9"		
6- 7- 8- 9-	ο C	Augured, no split spoon per client					
10- 11-	000000000000000000000000000000000000000	Gravel Gley N7; gravel fragments and some sand; (10.25 to 12.0' Interpretation)	al				
13	000000000000000000000000000000000000000	Gravel Gley N7; gravel fragments and some sand; (12.17 to 14.0' Interpretation)		ИИ			(#)
15		Augured, no split spoon per client					

Drill Method: Track Auger Rig

Drill Date: 07/22/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-86U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

- 30	SUBSURFACE PROFILE			MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
16- 17- 18- 19- 20- 21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 30- 30- 30- 30- 30- 30- 30- 30- 30		Sandy Clay Loam 10YR4/2; 50% weathered N4 dolomite; WET; (29.17 to 29.5' Interpretation); REFUSAL at 29.5'			14"		

Drill Method: Track Auger Rig

Drill Date: 07/22/07

Hole Size: 6 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-87U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

Soil	Lo	gger: Matthew C. Whitman					, FA 10025
	SUBSURFACE PROFILE			WPLI		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0- 1- 2- 3- 3-		Ground Surface Concrete Gley 7N Silt Loam 7.5YR4/3; moist Gravel and Sand 7.5YR3/1 Gravel and Sand Interpretation		G	23"	10	Metals, VOCs, TPH, and PCBs
6- H 7- 8		Gravel and Sand 7.5YR2/1; 20% gravel Clay Loam 5YR4/4 Gravel Fill; dolomite gravel Sandy Loam 7.5YR4/6; large gravel 40%; WET Silty Clay Loam 10YR4/1 Silty Clay Loam Interpretation		ĵ	48"		
10-1		Silt Loam 7,5YR3/1; moist Sandy Loam 5Y5/2; very fine sand; moist		G	42"		

Drill Method: Geoprobe Truck

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-87U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPL		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
12-	75-75-7 7-75-7 72-72-	Gravel and Sand Large sand; moist				2	
13-		Silt Loam 5Y4/2; moist Sandy Loam		ט			
14-		2.5Y5/3; fine sand Sandy Loam Interpretation					
15-	2-7- 1/2-1/	Sand Black; WET		lu l			
16-	345	Slag Copper slag Silt Loam			35"	5	
17-	A D D D D D D D D D D D D D D D D D D D	2.5Y4/1; WET Sandy Loam 10YR4/6					
18-	DING.	Dolomite Gravel fragments					
19-		Loamy Sand 10YR4/6; 40% dolomite gravel Loamy Sand					_
20-		Interpretation Sand 7.5YR4/6; sand to sand loam with	/			6	
21-		30% gravel; WET Sandstone Gravel and fragments; WET			27"		
22-		Sand 7,5YR4/6; medium to fine grain; WET	/				
23-		Sand Interpretation; REFUSAL at 22.3'					

Drill Method: Geoprobe Truck

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-88U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

- 200	Description Ground Surface	Number	əç	very	Lamp	Lab Analysis
	Cround Surface		Туре	Recovery	ppm 10 20 30 40 50 60	Lab / tilalysis
2 14	Concrete Slag Iron slag; black gravel and sand Slag Gley 8N to 5N		C	35"	57.7 / strong solv	ent odor Metals, VOCs, TPH, and PCBs
4 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Slag Unterpretation Slag With concrete dust / chips Slag Gley 6/10GY; Copper slag Slag Gley 7N and 6/10GY; copper slag; moist Sandstone Gravel sandstone; 80% fragments; 20% sand; WET Silt Loam Interpretation Sand Gley 4N; with 20% gravel Sand and Gravel WET Silt Loam Gley 3/10Y; moist		G	39"	6.1 / strong solvent odor	

Drill Method: Geoprobe Truck

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-88U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Matthew C. Whitman



Chambers Environmental Group 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
15-	100 to 10	Silt Loam Interpretation Sand and Gravel WET		G	17"	3	
17-		Sand and Gravel Interpretation					
19-		Sand Gley 4/10GY; fine grains; moist					
21-	00 00 00 00 00	Sand Medium to large grain sands; WET Gravel Very small to small alluvium gravel Gravel and Sand			54*	2	
24-	Page 6	WET Sand 7.5YR4/4; fine to medium tightly packed; WET Sand					
26-		Interpretation Gravel and Sand 70% gravel; WET Sand Fine to medium tightly packed; WET		With the -d-	32"	1	
28-	- THE			6.6			

Drill Method: Geoprobe Truck

Drill Date: 07/21/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-89U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group 629 East Rolling Ridge Drive

Bellefonte, PA 16823

		SUBSURFACE PROFILE	SA	MPLI		VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Туре	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
0- 1- 2- 3- 4- 5- 6- 7-	1/4/1/4/4/4/4/4/4/4/4/4/4/4/4/4/4/4/4/4	Ground Surface Concrete Slag Iron slag; black Loam 10YR5/1; 10% black iron slag Loam 10YR2/1; 10% copper slag Ash ; 20% Gley 1 6/5GY loam Ash Interpretation Loam 10YR4/2; with 5% copper slag and 5% iron slag Slag Copper slag; Gey 1 6/10Y Slag Interpretation		G	25"	2	Metals, VOCs, TPH, and PCBs

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Soil Boring Log: SB-89U

Project No: 07-051596

Project: Plant 4

Client: Marmon Group

Location: Bellefonte, PA

Soil Logger: Steve Levitsky, CPSSc



Chambers Environmental Group

629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE			MPLE	=	VOC Concentration PID Meter 2020	
Depth	Symbol	Description	Number	Type	Recovery	Lamp ppm 10 20 30 40 50 60	Lab Analysis
9	1/2/1/2/1/2/1/2/2/2/2/2/2/2/2/2/2/2/2/2	Loam 10YR4/2; 5% limestone/dolomite Loam 10YR3/2; 50% copper slag - Gley 1 3/10Y; WET Silt Loam 10YR3/1; moist			33"	7	
14- 15- 16- 17-		Silt Loam 10YR3/1; with 50% limestone chips Limestone Gatesburg chips Limestone Interpretation; REFUSAL at 17.0'		G	17"	4	

Drill Method: Geoprobe Track Rig

Drill Date: 07/22/07

Hole Size: 2 Inch

Datum: Local

Drilled by: Bassett Environmental Associates

Monitoring Well: SB-52U-D

CHAMBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

						belleforite, PA 10023
		SUBSURFACE PROFILE		SAMP	LE	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0-		Ground Surface				gorn gorn
1 2 3 4 5 6 7 8 9 10 11 11 11 11 11 11 11 11 11 11 11 11		Asphalt Sandy Loam 7,5 YR 3/2; Moist to wet at 11.5'. At 6-14' 20% medium gravel	Moist		0.0	Bentonite 7
0 1 2 3 4 5 6 7 8 9 10 11 1 2 1 3 1 1 1 1 2 2 2 1 1 1 1 2 2 2 2		Relamite	Wet		0.0	-WTO :5: DTW-
26 27 28 29 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 5	11	Weathered dolomite; Competent bedrock at 25.5'. Dolomite N7 to N4; Small fractures at 30.5', 32-33', 34.5', 36-36.5', 38', 42.5', and 44.5'. Wet. Crystalline (finely) from 39-45'.	Wet			2" Screen
46-		End of Borehole				

Drill Method: 6.25-Inch ID Hollow Stem Auger; NQ Rock Coring

Drill Date: March 19, 2010

Hole Size; 8.25-Inch from 0-27' and 2.5-Inch from 27-45'

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-52U-S

Project: Cerro Metals

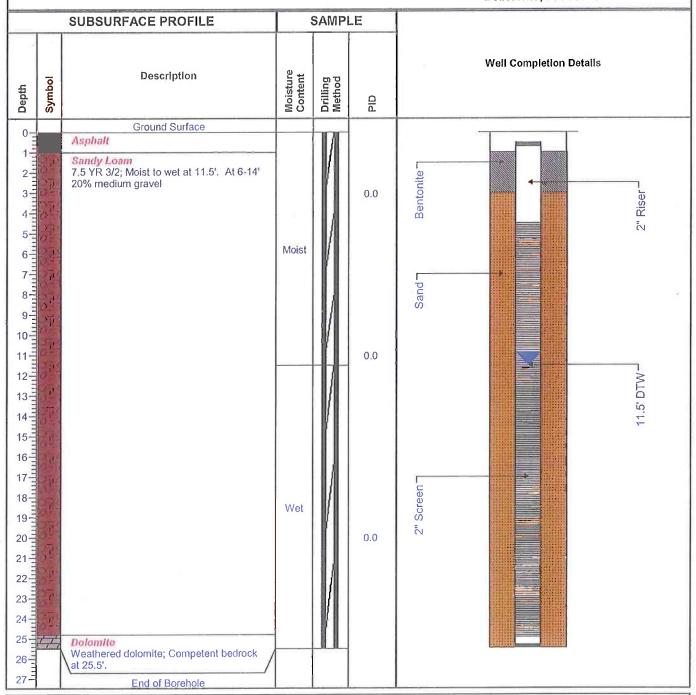
Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: 6.25 Inch ID Hollow Stem Auger

Drill Date: March 11, 2010

Hole Size: 8.25-Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-56U-D

CHAMBERS ENVIRONMENTAL GROUP, INC.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

						Bellefonte, PA 10823
		SUBSURFACE PROFILE		SAMP	LE	
Depth	Symbol	Description	Moisture Content	Drilling Method	OIA	Well Completion Details
0-		Ground Surface		N 70		6234 W291
0 1 2 3 4 5 6 H	1/2/1/2/	Asphalt Slag Gley 2 8/5PB; Trace to some ash. Moist to wet. At 5'-bgs, ash is approx. 50%	Dry		0.0	Ser T
7 8 9 10 11 12 13 14 15 15	والوسالو مراجه مراجه مراجه تراجه		Moist		0.0	Bentonite 7
16 17 18 19 20 21 22 23 24 25 26			Wet		0.0	16.5' DTW
26 27 28 29 30 31 32 33 34 35 36 37 38 37 40 41 42 43 46 46	を受けたけんがあったが	N7 to N6; Fracture at 28' and 28.5', Wet, Dolomite N6 to N4; Finely crystalline; Fractures at 33', 34', 42-42.5', 43', and 44.5'. Wet				Sand – Fall-In Materia
46-		End of Borehole				

Drill Method: 6.25-Inch ID Hollow Stem Auger; NQ Rock Coring

Drill Date: March 23, 2010

Hole Size: 8.25-Inch to 27.8' and 2.5-Inch from 27.8' to 45'

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-56U-S

CHAMBERS ENVIRONMENTAL GROUP, INC.

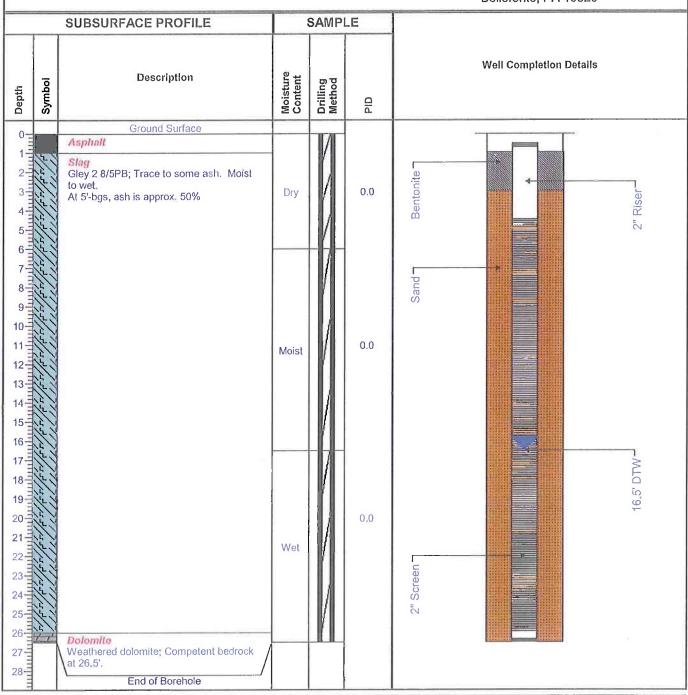
Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: 6,25-Inch ID Hollow Stem Auger

Drill Date: March 11, 2010

Hole Size: 8.25-Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-57U-D

Logger: Steve Treschow, P.G.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive

Bellefonte, PA 16823

		SUBSURFACE PROFILE		SAMP	_E	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0 1 2 3 4 5 6 7 8 9 10 1 1 2 1 3 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	الراد والمرد والرد والمرد والرد والرد	Ground Surface Concrete Slag Gley 18/N to Gley 1 6/N; Increasing size in slag as depth progresses; Trace to some ash (5-15%); Trace iron slag at 20', Gley 1 3/N Dry to damp. Wet at 17.5'. Hard, possible molten layer of slag at 20-20.5 ft-bgs. Trace (5%) ash at 24.5'.	Dry			Bentonite 7
167189019999999999999999999999999999999999	الرارا المويم المويم المويم الرويم الرويم					Ben WTG 'S, 71
323344111111111111111111111111111111111	7075	Sandy Loam 10YR 4/3; Trace to some fine gravel, Wet. Limestone 5B 7/1; Highly fractured, light effervesince with HCl. Wet. (Core recovery is poor.)	Wet			
46 47 48 49 50 51 52 53 55 55 55 55 55 55 55 55 55 55 55 55		Dolomite N4. Unfractured to slightly fractured, Wet. Extremely hard drilling, rock is very hard with little natural fracturing. End of Borehole				Sand Sand 2" Screen

Drill Method: 6.25-Inch ID Hollow Stem Auger

Drill Date: March 5 and 8, 2010

Hole Size: 8.25-Inch to 42' and 2.5-Inch from 42-57'

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-57U-I

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

					Bellefonte, PA 16823
	SUBSURFACE PROFILE		SAMP	LE	
Depth Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0 1 1 2 3 4 5 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ground Surface Concrete Slag Gley 18/N to Gley 1 6/N; Increasing size in slag as depth progresses; Trace to some ash (5-15%); Trace iron slag at 20', Gley 1 3/N Dry to damp. Wet at 17'. Hard, possible molten layer of slag at 20-20.5 ft-bgs. Trace (5%) ash at 24.5'. Sandy Loam 10YR 4/3; Trace to some fine gravel. Wet.	Dry			2" Screen Sand Bentonite 17.0" DTW 2" Riser 2" Riser

Drill Method: 6.25-Inch ID Hollow Stem Auger

Drill Date: March 4 and 5, 2010

Hole Size: 8.25-Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-57U-S

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE		SAMP	LE	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0		Ground Surface				
1	المرابي	Concrete Slag Gley 1 8/N to Gley 1 6/N; Increasing size in slag as depth progresses; 20% ash, Dry.				Sand Bentonite Bentonite 2" Screen 2" Riser
15 16 17 18 19 20 21 22 23 1		—Gley 2 3/10G and Gley 1 3/N; Ash content — 40-50%; Trace to some iron slag. Damp to wet at 18'.	Moist			16.4 DTW
24 - 25 - 26 - 27 - 27 - 27 - 27 - 27 - 27 - 27	1/20/100	Gley 1 8/N to Gley 1 6/N; 20% iron slag; Ash content 5-50%; Wet.				

Drill Method: 6.25-Inch ID Hollow Stem Auger

Drill Date: March 4, 2010

Hole Size: 8.25-Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-61U-D

CHAMBERS ENVIRONMENTAL GROUP, INC.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE		SAMPI	-E	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
		Ground Surface		11211		
1 1 1	Sin.	Concrete	Dry		0	
0 1 1 2 3 4 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	1/51/	Ash Gley 1 2.5/N; Moist	Moist		0	Bentonite 7
7- 8-	11	Gley 1 8/5G; Moist Dolomite				nto
9-	14	Wealhered; Moist; Auger refusal	Moist			B B
9 10 11 12 13 14 15 16 17 18 19 10 20 21 17 18 19 10 21 22 23 24 25 26 27 28 29 30 31 32 33 34 40 41 42 44 44 44 44 44 44		Dolomite 5B 5/1 to 5B 7/1; Moist to wet at 10.0'; Massive crystalline, few calcareous veins	Wet		0	Sand Screen Riser 10.0' DTW:
45 46	11	End of Borehole				-
		Clid of potential				

Drill Method: 6.25" HSA and NQ Rock Coring

Drill Date: November 19, 2008

Hole Size: 6.25 Inch and 3 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-61U-S

CHAMBERS ENVIRONMENTAL GROUP, INC.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Bill Hoffman, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

						Deliefonte, 1 A 10020
		SUBSURFACE PROFILE		SAMPL	-E	
Depth	Symbol	Description	Moisture Content	Drilling Method	PiD	Well Completion Details
0-		Ground Surface				T T
		Concrete				
2-	1/2/2/	Slag Gley 1	Moist		0	Bentonite
3-	الرويرال	Slag 10YR4/1	Moist		2	Benton
6-	1/20/1	Slag N5 to 10YR5/6	Moist		0	5.61 DTW
8-	2/12/2		Wet			5.6.
10- 11- 12- 13- 14- 15- 16-		Augured, no split spoon per client				Sand
17- 18- 19- 20- 21- 22-		Sand and Gravel 10YR4/3; Alluvial sand	Wet		2	
3	- 33	Limestone Slightly weathered dolomite; 5PB7/1	Wet		1	
23-	=	End of Borehole				
24-						

Drill Method: Track Mounted Auger

Drill Date: November 12, 2007

Hole Size: 8-Inch

Datum: Local

Checked by:

Monitoring Well: SB-65U-D

CHANBERS ENVIRONMENTAL GROUP, INC.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

						Delicione, 177 veez
		SUBSURFACE PROFILE		SAMPI	_E	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
		Ground Surface	Dn/	TIESTI .		
0- 1- 2- 3- 4- 5- 6- 7- 8-	1/25/101/101/10 1/101/101/101/10	Concrete Slag Gley 1 3/N; Copper slag, Ash, and Gravel; Moist to Wel; Loose culting return from 5.5' to 21'	Moist		0 0	Holeping
9- 10- 11- 12- 13- 14- 15- 16- 17- 18- 19- 20-	ار ا		Wet		0	8.27' DTW
21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32- 33- 34- 35-		Dolomite 5B 5/1 to 5B 7/1; Few fractures; Increasing crystalline with depth; Wet;	Wet			Riser
36- 37- 38- 39- 40- 41- 42- 43- 44-	17	Dolomite 5B 5/1 to 5B 7/1; Dolomite; Small fracture - 1" at 36' Dolomite 5B 5/1 to 5B 7/1; Dolomite; Small fractures 5B 5/1 to 5B 7/1; Dolomite; Small fractures - 2" at 39' and 2" at 40.5'; Extremely hard drilling at 42-45'				Sand
45 46	IIII	End of Borehole				Amuj

Drill Method: 6.25" HSA and NQ Coring

Drill Date: March 3-4, 2009

Hole Size: 6.25 Inch (To 21') and 2.5 Inch (21' to 45')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-66U-D



Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE		SAMP	LE	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0		Ground Surface				
1=	37/	Concrete	Dry		0	
0 12 33 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 10 11 13 14 15 16 17 18 19 10 12 12 13 14 15 16 17 18 19 10 12 12 13 14 15 16 17 18 19 10 10 10 10 10 10 10		No Return Wet at 11.0' Dolomite 5B 5/1 to 5B 7/1; Numerous calcareous veins and sand lenses; Wet; Fractures at 30.5' and 38'	Moist		0	Screen Riser 11.0' DTW
44 45 46	11,	End of Borehole				

Drill Method: 6.25" HSA and NQ Coring

Drill Date: November 18, 2008

Hole Size: 6.25 Inch and 2.5 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-66U-D1

CHANBERS ENVIRONMENTAL GROUP, INC.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE		SAMP	LE	
Depth	Symbol	Description	Moisture Content	Drilling Method	DIO	Well Completion Details
		Ground Surface		11211		920 920
1 2 3 4 5 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10		Concrete Sandy Loam 10YR 3/2 to 10YR 4/3; Some gravel; Moist to Wet; Loose cutting return from 11' to 24.5'; Auger refusal at 29.0'	Moist		0 0	8.30° DTW
0 11 2 11 11 11 11 11 11 11 11 11 11 11 1			Wet		0	8.30° DTW
24- 25- 26- 27- 28- 29- 30- 31- 32- 33- 34- 35- 36- 37- 38- 40- 41- 42- 43- 44- 45- 46-		Dolomite 5B 5/1 to 5B 7/1; Few fractures; Increasing crystalline with depth; Fracture at 36.0' to 36.5'; Wet;	Wet			Screen
46-		End of Borehole				- Control of the Cont

Drill Method: 6.25" HSA and NQ Coring

Drill Date: March 2-3, 2009

Hole Size: 6.25 Inch (To 29') and 2.5 Inch (29' to 45')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-67U-D

CHANBERS ENVIRONMENTAL GROUP, INC.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Matthew C. Whitman

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

		OUR OUR PROFILE		SAMP	F I	Bollorente, T. T. T.
Depth	Symbol	SUBSURFACE PROFILE Description	Moisture Content	Drilling Method	PID	Well Completion Details
		Ground Surface				
1 2 3 4 5 6 7 8- 9-		No Return	Dry Moist		0 0	Bentonite
11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 34 1		Dolomite 5B 5/1 to 5B 7/1; Wet	Wet		0	Riser
35- 36- 37- 38- 39- 40- 41- 42- 43- 44-						Sand
46	III	End of Borehole				

Drill Method: 6.25" HSA and NQ Coring

Drill Date: November 19, 2008

Hole Size: 6.25 Inch and 2.5 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-67U-D

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Matthew C. Whitman



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

						Bellefonte, PA 16823
		SUBSURFACE PROFILE		SAMP	LE	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0-	DIPVA	Ground Surface		10211		
1-		Concrete	Dry		0	
0 1 2 3 4 1 1 1 1 1 1 1 1 1		No Return Wet at 11.0'	Moist		0	Bentonite
12 13 14 15 16 17 18 19 19 19 19 19 19 19		Dolomite 5B 5/1 to 5B 7/1; Numfrous calcareous veins and sand lenses; Wet; Fractures at 30.5' and 38'	Wet		0	Sand Sand Riser 11.0° DTW-
45		End of Borehole				
						L

Drill Method: 6.25" HSA and NQ Coring

Drill Date: November 18, 2008

Hole Size: 6.25 Inch and 3 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-68U-S

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

					Dellefolite, PA 10023
	SUBSURFACE PROFILE		SAMP	LE	
Depth Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0 - 10000000	Ground Surface			THE T	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	Slag Gley 1 6/N to Gley 1 6/N; Slag fragments increase in size with depth. Dry to wet at 18.0'. At 11.0' increase in iron slag (5-20%); Gley 4/10 BG	Dry		281	Sand Bentonite Bentonite 2" Screen 2" Riser 2" Riser
16 17 18		Moist			
19 20 21 22 23 24 25 27 26 27 28 28 28 28 28 28 28 28 28 28 28 28 28	Ash Gley 2 3/10G and Gley 1 3/N; Ash content 40-50%; Trace to some iron slag. Damp to wet at 18'. Dolomite Possible weathered bedrock	Wet			- WTG DTW
28	End of Borehole				1

Drill Method: 6.25-Inch ID Hollow Stem Auger

Drill Date: March 4, 2010

Hole Size: 8.25-Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-68U-D

CHANBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

						Bellefonte, PA 16823
		SUBSURFACE PROFILE		SAMP	LE	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0=	Dava	Ground Surface		H H	207	8227 8227 8227
0123456789101141411411411411414141414141414141414	المؤديم المودر الدوم الموديرا	Concrete Slag Gley 1 6/N to Gley 1 6/N; Slag fragments increase in size with depth. Dry to wet at 18.0'. At 11.0' increase in iron slag (5-20%); Gley 4/10 BG	Dry			2" Riser
1/雪	12 1		Moist			
19 20 21 22 23 24 25 25	12.20/20/	Ash	Wet			17.0 DTW
18 19 20 19 20 21 22 23 24 25 26 27 28 29 33 33 34 35 37 38 38 39 30 30 30 30 30 30 30 30 30 30 30 30 30	الرديم إن در إن در إن در إن در	Gley 2 3/10G and Gley 1 3/N; Ash content 40-50%; Trace to some iron slag. Damp to wet at 18'. Slag Gley 1 6/N				
41-1 42-1 43-1		Limestone N4; Slight efferenscance with HCl; Wet. Highly weathered/fractured. Lose water at 43.8, small fracture.	Wet			
45 46 47 48 49	/ / / / 1 / /	N6 to N8; Slightly crystaline, wet, Moderately fractured.				Sand
51 52 53		Limestone N4; Slight efferensance with HCI. Wet. Slightly fractured. Borehole bridges off at 50 ft-bgs.				Collapse Material
56		End of Borehole				

Drill Method: 6.25-Inch ID Hollow Stem Auger

Drill Date: March 11-16, 2010

Hole Size; 8.25-Inch to 39,5' and 2.5-Inch from 39.5' to 55'

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-71U-S



Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

SUBSURFACE PROFILE SAMPLE	
Mell Comble Mell Comble Mell Comble	tion Detalls
Cround Surface	
Asphalt Slag Gley 2 7/SPB; Some ash (20%); Moist to wet; Odors at 3.0'; Trace water at 16' 4 1 1 1 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	4" Riser
9 10 11 12 12 13 13 13 14 15 15 16 15 15 16 15 15 16 15 15 16 15 15 16 15 15 16 15 15 16 15 15 16 15 15 16 15 15 16 15 15 16 15 16 15 16 15 16 16 16 16 16 16 16 16 16 16 16 16 16	
17 12 Moist 0.0	E E
18	4" Screen
30 End of Borehole	

Drill Method: Air Rotary

Drill Date: June 25, 2009

Hole Size: 5-Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-72U-D

Project: Cerro Metals

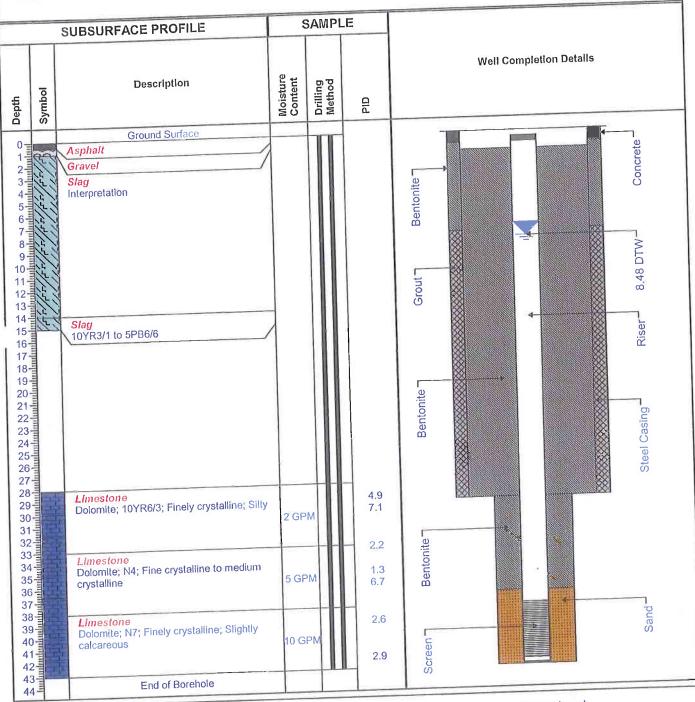
Client: Marmon Group

Location: Bellefonte, PA

Logger: Bill Hoffman, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: Air Rotary

Drill Date: November 15 & 20, 2007

Hole Size: 10-Inch Top & 6-Inch Bottom

Datum: Local

Checked by:

Monitoring Well: SB-72U-S

Project: Cerro Metals

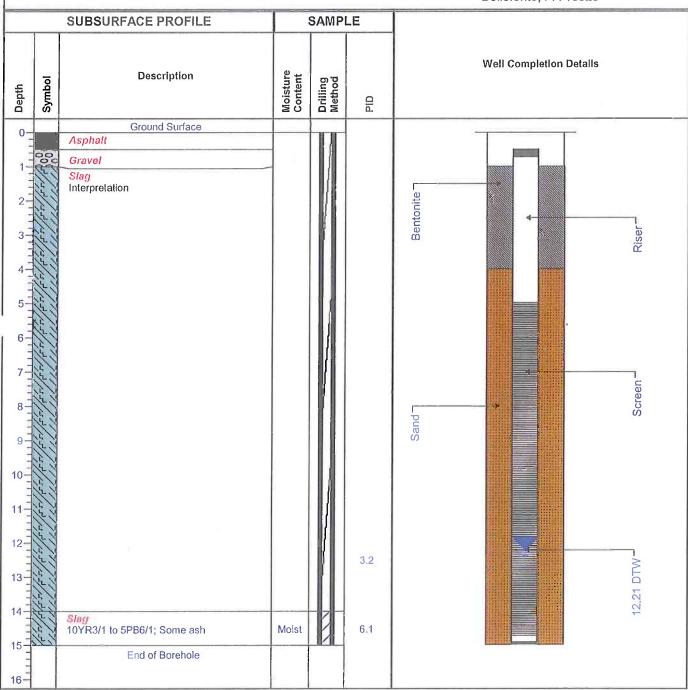
Client: Marmon Group

Location: Bellefonte, PA

Logger: Bill Hoffman, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: Track Mounted Auger

Drill Date: November 12, 2007

Hole Size: 8-Inch

Datum: Local

Checked by:

Monitoring Well: SB-76U-D

CHANBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

	SUBSURFACE PROFILE		SAMP	LE	
Depth Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
0	Ground Surface		- Name of the last		7,000
0 1 2 3 4 4 4 4	Concrete Slag Gley 1 8/10 GY; Trace ash.	Dry		0	
5 formula of the second of the	Sandy Loam 10YR 6/6; Trace stag. Possible Boulder at 8.5'	Moist		0	Bentonite/Holeplug -
12	Silt Loam 10YR 4/3; Trace slag. Moist to wet at 17.5'. Silty Clay Loam	Wet	/	0	17,5' DTW7
25 26 27 27 28 29 29 29 29 29 29 29 29 29 29 29 29 29	Dolomite N3; Weathered dolomite; Highly fractured, Wet. Lose water circulation. Dolomite N4 to N5; Slightly fractured with iron staining in fractures. Mild effervensce from 27-31'. Small fractures at 30', 31.5', 34', 35.5', 36', 41.5', 42', and 44'. Wet.	Wet			Collapse Material
45 46	End of Borehole		_11_11_		

Drill Method: 6,25" HSA and NQ Coring

Drill Date: March 18, 2010

Hole Size: 6.25 Inch (To 6') and 2.5 Inch (6' to 41.5')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-77U-D

CHANBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

			Donotonto, () () ()			
		SUBSURFACE PROFILE	SAMPLE			
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
_		Ground Surface		8-11		
0 1 2 3 4 5 5 6 7 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9		Concrete Ash Gley 1 3/N; Gravel present; Moist Dolomite Weathered; Moist Dolomite 5B 5/1 to 5B 7/1; Mildly fractured, some calcareous veins, few sand lenses; Moist to wet at 10.5'; Fracture at approx. 35', 1' to 2' fracture	Dry		0 0 0	Bentonite
22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32- 33- 34- 35- 36- 37- 38- 39- 40- 41- 42- 43- 44- 44- 44- 44- 44- 44- 44- 44- 44		End of Borehole	Wet			Sand

Drill Method: 6.25" HSA and NQ Rock Coring

Drill Date: November 14 & 15, 2008

Hole Size: 6.25 Inch and 3 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-77U-D1

CHAMBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

SUBSURFACE PROFILE SAMPLE Well Completion Details Cround Surface Cround Surface Cround Surface Sandy Loam 10YR 3/2 to 10YR4/3; Some gravel; Wet at 11.5' Moist Wet Dry 0 Moist Wet Dry 0 Moist Wet Dry 0 Moist Wet Sandy Loam 10YR 3/2 to 10YR4/3; Some gravel; Wet at 11.5' Moist Wet Dry 0 Moist Wet Sandy Loam 10YR 3/2 to 10YR4/3; Some gravel; Wet at 11.5' Moist Wet Sandy Loam 10YR 3/2 to 10YR4/3; Some gravel; Wet at 11.5' Moist Wet Sandy Loam 10YR 3/2 to 10YR4/3; Some gravel; Wet at 11.5' Moist Wet Sandy Loam 10YR 3/2 to 10YR4/3; Some gravel; Wet at 11.5' Moist Wet Sandy Loam 10YR 3/2 to 10YR4/3; Some gravel; Wet at 11.5' Moist Wet Sandy Loam 10YR 3/2 to 10YR4/3; Some gravel; Wet at 11.5' Dolomite 33.2'; Increasing crystalline with depth; Wet 33.2'; Increasing crystalline with depth; Wet 33.3' and 39' to 39.25'; Wet 34.5' and 34.5'							Delleforite, PA 10020
Description			SUBSURFACE PROFILE		SAMP	LE	
Concrete Sandy Loam 1	Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
Sandy Loam 10 YR 3/2 to 10 YR4/3; Some gravel; Wet at 11.5 Sandy Loam 10 YR 3/2 to 10 YR4/3; Some gravel; Wet at 11.5 Moist Moist Moist Dolomite 5B 5/1 to 5B 7/1; Fracture at 33.0 to 33.25; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Fracture at 35.0 to 33.25; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Fracture at 35.0 to 35.33 and 39' to 39.25; Wet Dolomite 35.34 and 39' to 39.25; Wet Dolomite 35.34 and 39' to 39.25; Wet			Ground Surface		1170		
Dolomite 5B 5/1 to 5B 7/1; Fracture at 33.0' to 33,25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Fracture at 35.0' to 33,25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet	1	0.55500		Dry	Ш	0	
Dolomite 5B 5/1 to 5B 7/1; Fracture at 33.0' to 33,25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Fracture at 35.0' to 33,25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet	3	775	10YR 3/2 to 10YR4/3; Some gravel; Wet	Diy	И	0	
Dolomite 5B 5/1 to 5B 7/1; Fracture at 33.0' to 33,25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Fracture at 35.0' to 33,25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet	4 5 6 7 8 9		at 11.5°	Moist			TWTO
Dolomite 5B 5/1 to 5B 7/1; Fracture at 33.0' to 33,25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Fracture at 35.0' to 33,25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet	11- 12-	3,					30".
Dolomite 5B 5/1 to 5B 7/1; Fracture at 33.0' to 33.25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Fracture at 33.0' to 33.25'; Increasing crystalline with depth; Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet Wet Dolomite 5B 5/1 to 5B 7/1; Few fractures at 35.0' to 35.33' and 39' to 39.25'; Wet	24-	1 44		Wet		0	
34	25- 26- 27- 28- 29- 30- 31- 32-		5B 5/1 to 5B 7/1; Fracture at 33,0' to 33,25'; Increasing crystalline with depth;				
46 End of Borehole	34- 35- 36- 37- 38- 39- 40- 41- 42- 43- 44-		5B 5/1 to 5B 7/1: Few fractures at 35.0' to	Wet			Soreen
	46-		End of Borehole	1			

Drill Method: 6.25" HSA and NQ Coring

Drill Date: February 27, 2009

Hole Size: 6.25 Inch (To 6') and 2.5 Inch (6' to 41.5')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-78U-D

CHAMBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

	-	SUBSURFACE PROFILE	SAMPLE			Bolloforkey 171 10025
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
		Ground Surface		820		
0-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-7-28-29-30-31-32-33-34-35-36-37-38-39-40-41-1-12-13-14-15-16-17-7-18-19-12-12-12-12-12-12-12-12-12-12-12-12-12-		Concrete Sandy Loam 10YR 4/3; With gravel; Moist to wet at 8.5* Dolomite 5B 5/1 to 5B 7/1; Numerous calcareous veins; Wet	Moist		0 0 0	Screen Sand Riser 8.5' DTW
42 43 44	1/7	End of Borehole				CIDERIA CONTRACTOR OF THE CONT

Drill Method: 6.25" HSA and NQ Rock Coring

Drill Date: November 13, 2008

Hole Size: 6.25 Inch and 3 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-78U-D1

CHANBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

		SUBSURFACE PROFILE		SAMPL	.E					
Depth	Symbol	Description	Moisture Content	Drilling Method	Qld	Well Completion Details				
_		Ground Surface		11 78						
0 1 2 3 4 5	المرام مراري	Concrete Slag Gley 1 3/N; Copper slag, Ash, and Gravel; Dry to Moist; Auger refusal at 6.0'	Dry		0 0	n _l o				
6- 7- 8- 9- 10- 11- 12-		Dolomite 5B 5/1 to 5B 7/1; Few fractures; Increasing crystalline with depth; Moist to Wet;	Moist		0	8.18' DTW7				
13 14 15 16 17 18 19 20 21 22 25 26 27 28 29 29			Wet		0	Riser				
30- 31- 32- 33- 34- 35- 36- 37- 38- 39- 40- 41-		Dolomite 5B 5/1 to 5B 7/1; Few fractures at 32.0' to 32.17' and 35.5' to 35.75'; Very crystalline from 39' to 41.5'; Wet;				Collapse Material				
41 42	ninininininininininininininininininini	End of Borehole								

Drill Method: 6.25" HSA and NQ Coring

Drill Date: February 26, 2009

Hole Size: 6,25 Inch (To 6') and 2.5 Inch (6' to 41.5')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-78U-S

CHAMBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Matthew C. Whitman

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

						Delieforite, 177 10020
	-	SUBSURFACE PROFILE	SAMPLE			
Depth	Symbol	Description	Moisture Content	Drilling Method	OIA	Well Completion Details
		Ground Surface		11 /11	1	
3-3-6-7-	الرورا الويد الويدا الويدا لويدا ويدار ويدار ويدار ويدار ويدار ويدار	Concrete	- Dry Moist			Bentonite
10- 11- 12- 13- 14- 15- 16- 17-		Dolomite Weathered dolomite; Solid bedrock at approx. 14'; Wet End of Borehole	Wet			WTO '5.8

Drill Method; 6.25" HSA and NQ Rock Coring

Drill Date: November 13, 2008

Hole Size: 6.25 Inch and 2.5 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-79U-D



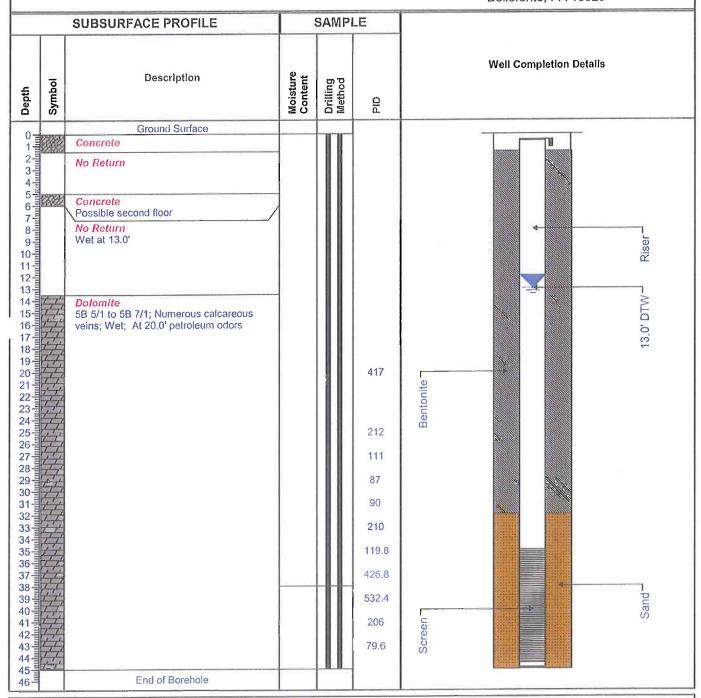
Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: 8" Air Rotary, 6.25" HSA, and NQ Rock Coring

Drill Date: October 30 and November 19, 2008

Hole Size: 8 Inch to 38 ft-bgs and 3 Inch to 45 ft-bgs

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-79U-D1

Project: Cerro Metals
Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

_	o o a a .	om Benerette, viv				Bellefonte, PA 16823
		SUBSURFACE PROFILE		SAMPI	E	
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
		Ground Surface		11 70		222
0-1-		Concrete		M	0	
2 3 4 5	الموقع الوقع إد	Slag Gley 1 3/N; Copper slag, Ash, and Gravel; Dry to Moist; Auger refusal at 7.0'	Dry		0	
7- 8- 9- 10- 11- 12- 13-		Dolomite 5B 5/1 to 5B 7/1; Few fractures at 19,75' to 19.83'; Increasing crystalline with depth; Moist to Wet;	Moist		- 0	8.42' DTW T
14- 15- 16- 17- 18- 19- 20- 21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32-		Dolomite	Wet		0	8,42
33- 34- 35- 36- 37- 38- 39- 40- 41- 42- 43- 44- 45- 46-		5B 5/1 to 5B 7/1; Few fractures at 42.0' to 42.5' and 44.25' to 44.33'; Wet				Collapse Material
46		End of Borehole				

Drill Method: 6.25" HSA and NQ Coring

Drill Date: February 25 & 26, 2009

Hole Size: 6.25 Inch (To 7') and 2.5 Inch (7' to 45.5')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-80U-D

CHANBERS ENVIRONMENTAL GROUP, INC.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

Description		Bellefolite, 177 10020								
Description			SUBSURFACE PROFILE		SAMP	_E				
Concrete Slag Slag Slag Slag Slag Slag Slag Slag	Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details			
Slag Gley 1 3/N; Copper slag, Ash, and Gravel; Molst; Auger refusal at 4 8' Dolomite 5B 5/1 to 5B 7/1; Few fractures at 19.5' to 19-67; 21.0' to 21.17', and 25.5' to 25.67' (Iron slained); Molst to Wel Dolomite 10-77 11-77 12-77 12-77 13-	0		Ground Surface		11.711					
Dolomite 19.67, 21.0" to 21.17", and 25.5" to 25.67" (iron stained); Moist to Wet 19.67, 21.0" to 21.17", and 25.5" to 25.67" (iron stained); Moist to Wet 19.77 18.77	2 H 3 H 4 H	12/20	Slag Glev 1 3/N: Copper slag, Ash, and Gravel;	Dry		0				
15 16 17 18 19 20 17 18 19 20 17 18 19 20 17 18 19 20 17 18 19 20 17 18 19 20 17 18 19 20 18 18 18 18 18 18 18 18 18 18 18 18 18	6 7 8 1 1 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Dolomite 5B 5/1 to 5B 7/1; Few fractures at 19.5' to 19.67', 21.0' to 21.17', and 25.5' to 25.67'	Moist		- 0	L MTG			
41 42 47 4 42 47 4 44 47 4 4 4 47 4 4 4 47 4 4 4 4	12 13 14 15 16 17 18 19 19 19 19 19 19 19					0	2" Riser			
56 Fnd of Borehole	41 42 43 44 45		5B 5/1 to 5B 7/1; Few fractures at 33.0' to 33.08'(iron stained), 46.0' to 46.17', 50.0' to 50.6', 53.0' to 53.5', and 53.75' to 54.00'; Wet	Wet			Screen			
1-114 M. Table District	56		End of Borehole				Promis			

Drill Method: 6.25" HSA and NQ Coring

Drill Date: February 23 & 25, 2009

Hole Size: 6,25 Inch (To 4.8') and 2.5 Inch (4.8' to 55.5')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-81U-D

CHAMBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

	Bollelonte, 177 Comment									
		SUBSURFACE PROFILE	SAMPLE							
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details				
		Ground Surface		пп						
01234567	2732h	Concrete Sandy Loam 10YR 4/3; With some gravel; Moist to wet at 8.0'	Moist		0					
78001234567899 11234567899		Dolomite 5B 5/1 to 5B 7/1; Massive, crystalline; Wet			0	Bentonite 8.0' DTW-				
2012/3455-07-89-01-23-45567-89-01-23-455-07-89-01-23-455-07-89-01-23-45567-89-01-23-4567-89-01-23-50-20-20-20-20-20-20-20-20-20-20-20-20-20			Wet			Riser				
\$66789012334566789012334567						Screen				
66 67	1	End of Borehole								

Drill Method: 6.25" HSA and NQ Rock Coring

Drill Date: November 13, 2008

Hole Size: 6.25 Inch and 2.5 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-85U-D

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

Locatio	II. Dellefonte, I I				Bellefonte, PA 10023
	SUBSURFACE PROFILE		SAMPL	.E	
Depth	Description	Moisture Content	Drilling Method	PID	Well Completion Details
10 0 1 2 3 4 5 6 7 8 9 0 1 1 1 2 2 3 4 4 5 6 6 7 8 9 1 0 1 1 2 2 2 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Gravel Fill material Sandy Loam 10YR 4/3; Dry to moist Dolomite 5B 5/1 to 5B 7/1; Numerous calcareous veins and sand lenses; Wet at 17,0'	Dry		0 0	Screen Bentonite Sand Riser 17.0' DTW
58 59	End of Borehole				й

Drill Method: 6" Air Rotary, 6.25" HSA, and NQ Rock Coring

Drill Date: October 29 and November 6, 2008

Hole Size: 6.25 Inch and 3 Inch

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-86U-D

CHAME

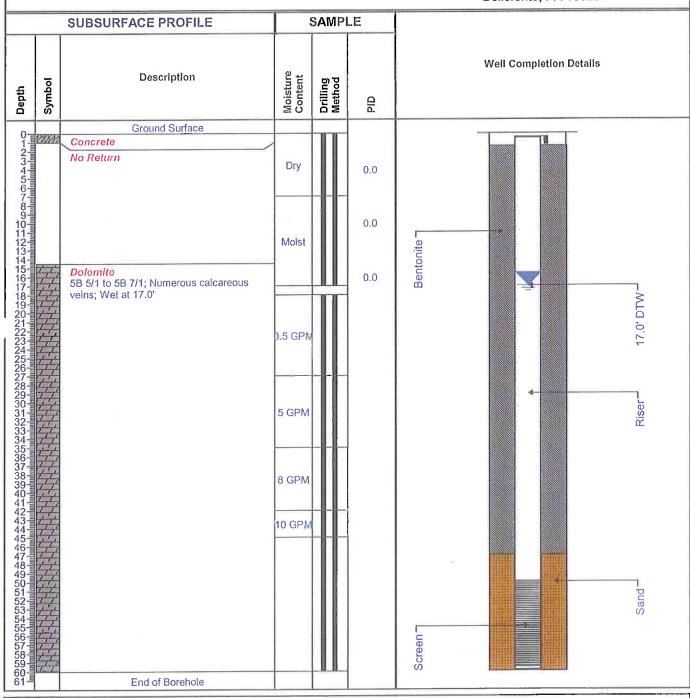
Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: 6" Air Rotary, 6.25" HSA, and NQ Rock Coring

Drill Date: October 27 and November 9, 2008

Hole Size: 6.25 Inch and 3 Inch

Datum: Local

Checked by S. Treschow, P.G.

Monitoring Well: SB-88U-D

CHAMBERS ENVIRONMENTAL GROUP, INC

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

	CANADIT										
		SUBSURFACE PROFILE		SAMPI	.E						
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details					
		Ground Surface		11 711							
0- 1- 2- 3-	1/20/	Concrete Slag Gley 1 3/N; Copper slag and ash; Loose return of cuttings from 9' to 19,5'; Moist to wet at 12.0'	Dry		0						
4- 5- 6- 7- 8- 9- 10-	المراكة مراكمة مراكمة مراكمة		Moist		0	7,82' DTW7					
12- 13- 14- 15- 16- 17- 18- 19-	1/2/1/2/		Wet		0	7 Bee					
20- 21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32-		Dolomite 5B 5/1 to 5B 7/1; Fractures at 23.5' to 23.58' and 28.5' to 28.58'; Increasing crystalline with depth; Wet	Wet			2" Riser					
33- 34- 35- 36- 37- 38- 39- 40- 41- 42- 43- 44- 45-	1//	Dolomite 5B 5/1 to 5B 7/1; Few fractures at 33.5' to 33.58' and 38.5' to 38.75'; Wet				Sand					
45 46	4	End of Borehole			_						

Drill Method: 6.25" HSA and NQ Coring

Drill Date: March 2, 2009

Hole Size: 6,25 Inch (To 19,5') and 2,5 Inch (19,5' to 45')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-89U-D



Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

1			Bellefonte, PA 10023			
		SUBSURFACE PROFILE	SAMPLE			
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
		Ground Surface				ESST 9293
1 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	3022	Concrete Sand 10YR 4/2; Gravelly sand with some silt. Railroad ties at 3.0'	Dry		0	
5 6 7 8 9 10 11 12 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	6/1/2	Slag Gley 2 7/5B; Copper slag.	Moist		0	8.72' DTW
14 15 16 17 18 19		Silty Sand 10YR 4/3; Silty sand with some clay and fine gravel. Moist to wet at 18,0'.	Wet		0	
20 21 22 23 24 25	10	Dolomite 5B 7/1 to 5B 5/1; Mixture of weathered dolomite and silty sand. Wet.				Z" Riser
26-11-11-12-12-12-12-12-12-12-12-12-12-12-	学学学学	Dolomite 5B 7/1 to 5B 5/1; Competent at 25'. Minor fracture (2") at 33,5' Fracture (4") at 35'. Loss of water. Dolomite becomes extremely hard at 38' with no water circulation from 35'-45'. Wet.	Wet			Sand
45 46		End of Borehole				
-					-	

Drill Method: 4.25" HSA and NQ Coring

Drill Date: December 1-3, 2009

Hole Size: 8.25 Inch (To 25') and 3 Inch (25' to 45')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: SB-89U-D1

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: S. Treschow, P.G.



Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

						Bellefonte, PA 16823		
		SUBSURFACE PROFILE	SAMPLE					
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details		
0 1 1 2 3 3 4 4 4 4 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1/2/2//2//2//2//	Concrete Gravel and Fill Railroad ties and other fill material; Cresote odor. Slag Gley 2 7/5PB; Copper slag. Loose cuttings, few return cuttings. Wet at 22.0'. Dolomite 5B 7/1; Mixture of weathered dolomite and silly sand. Wet. Dolomite 5B 7/1 to N4; Competent at 29.6'. Fractures at 31.0', 32.5', 39', 41.5' and 42'. Neally fractured from 34-38'. Lose water at 42.5' and very fractured from 43-45'. Wet. End of Borehole	Dry		0 0 0 0	Sand Bentonite/Holepfug 2" Screen 2" Riser 2" Riser 2" Riser 2" Riser 3" Ri		
4/-		Elia di Bolellole						

Drill Method: 8,25" HSA and NQ Coring

Drill Date: March 26-27, 2010

Hole Size: 8.25 Inch (To 29') and 3.8" Inch (29.6' to 45')

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: RW-1

CHANBERS ENVIRONMENTAL GROUP, INC.

Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823

******		SUBSURFACE PROFILE		SAMPI	_E				
Depth	Symbol	Description	Moisture Content	Drilling Method	DIG	Well Completion Details			
		Ground Surface							
0- 1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18-	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	Ground Surface Gravel Concrete Dolomite 5B 5/1 to 5B 7/1; 0.1 to 1gpm				Inside Floor of Furnace Bentonite			
19- 20- 21- 22- 23- 24-					0.0	inside Fid			

Drill Method: Hollow Stem Auger and Air Rotary

Drill Date: June 24, 2009

Hole Size: 6.25-Inch (ID - HSA) and 5-Inch Air Rotatry

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: RW-1



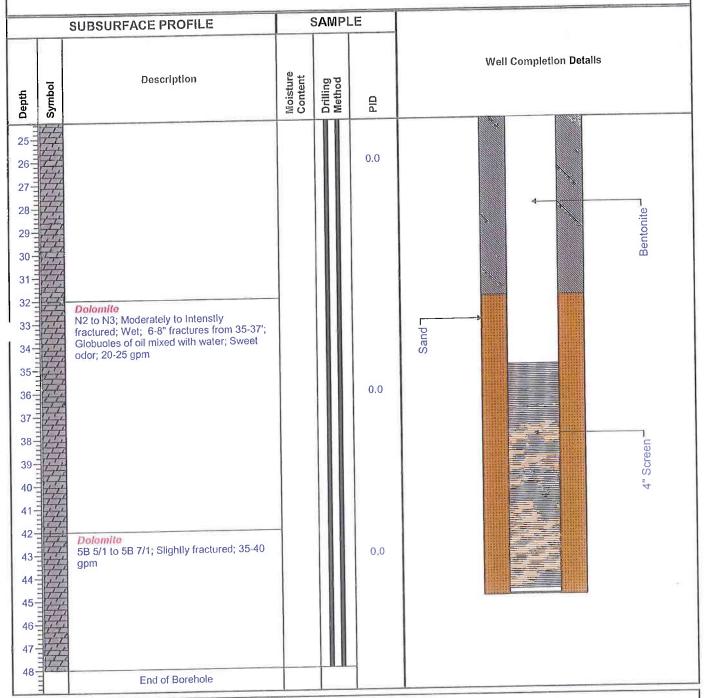
Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: Hollow Stem Auger and Air Rotary

Drill Date: June 24, 2009

Hole Size: 6,25-Inch (ID - HSA) and 5-Inch Air Rotatry

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: RW-2

CHAMBERS ENVIRONMENTAL GROUP, INC.

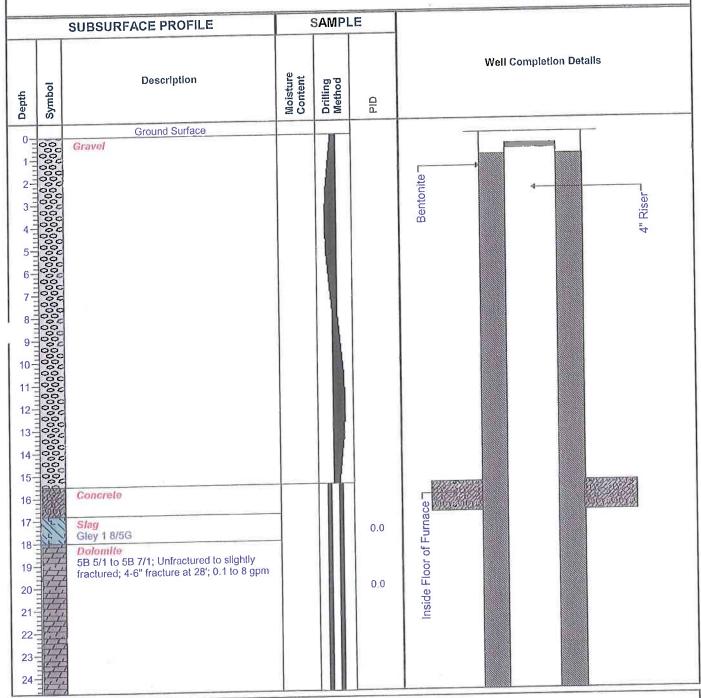
Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: Hollow Stem Auger and Air Rotary

Drill Date: June 24, 2009

Hole Size: 6.25-Inch (ID - HSA) and 5-Inch Air Rotatry

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: RW-2

CHANBERS ENVIRONMENTAL GROUP, INC

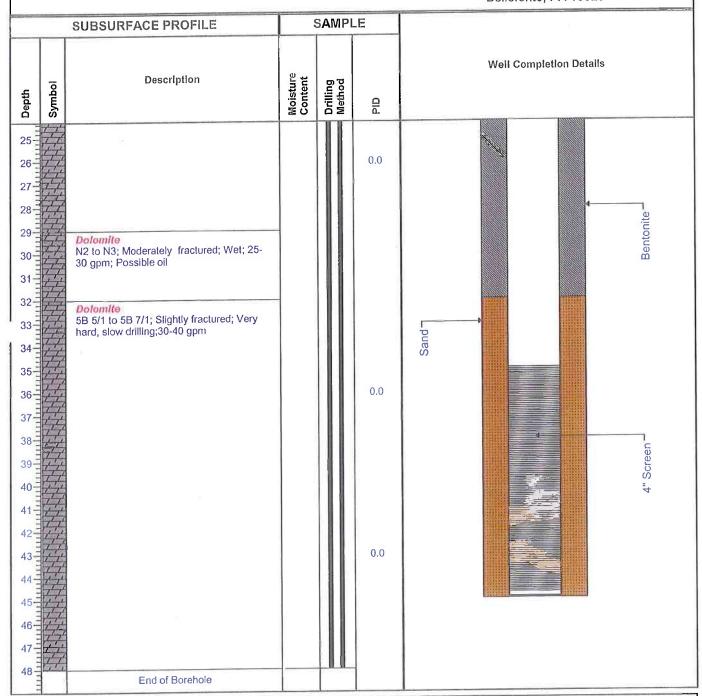
Project: Cerro Metals

Client: Marmon Group

Location: Bellefonte, PA

Logger: Steve Treschow, P.G.

Chambers Environmental Group, Inc. 629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: Hollow Stem Auger and Air Rotary

Drill Date: June 24, 2009

Hole Size: 6,25-Inch (ID - HSA) and 5-Inch Air Rotatry

Datum: Local

Checked by: S. Treschow, P.G.

Monitoring Well: RW-3

Project: Cerro Metals

Client: The Marmon Group

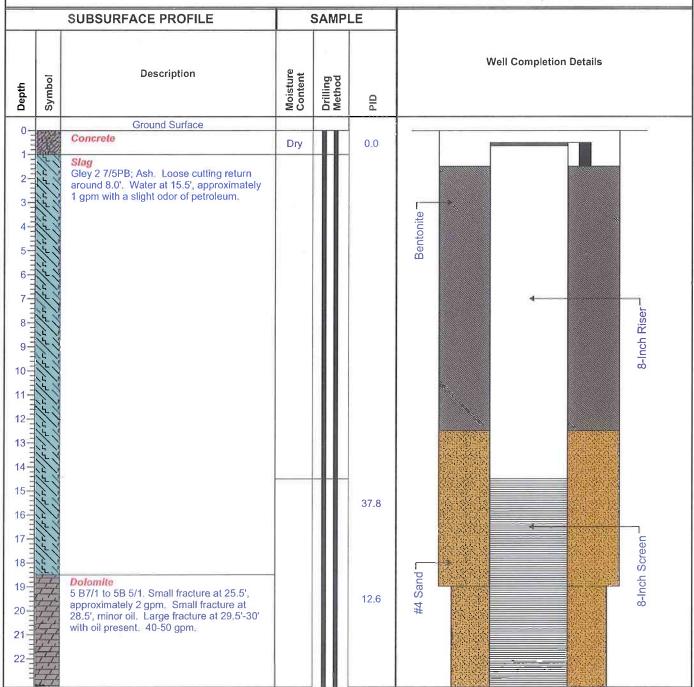
Location: Plant 4

Logger: Steve Treschow, P.G.



Chambers Environmental Group, Inc.

629 East Rolling Ridge Drive Bellefonte, PA 16823



Drill Method: Air Rotary with 14" and 10" Tri-cone roller bit

Drill Date: April 28, 2010

Hole Size: 14-Inch to 19 ft-bgs, 10-Inch from 19-45 ft-bgs

Datum:

Checked by: S. Treschow, P.G.

Monitoring Well: RW-3

Project: Cerro Metals

Client: The Marmon Group

Location: Plant 4

Logger: Steve Treschow, P.G.



Chambers Environmental Group, Inc.

629 East Rolling Ridge Drive Bellefonte, PA 16823

			Bellefonte, PA 16823			
		SUBSURFACE PROFILE	SAMPLE			
Depth	Symbol	Description	Moisture Content	Drilling Method	PID	Well Completion Details
24		End of Borehole	Wet		17.2 476 1,212 872 412 117 182	8-Inch Riser (Solid Sump) Bentonite
- 9						<u> </u>

Drill Method: Air Rotary with 14" and 10" Tri-cone roller bit

Drill Date: April 28, 2010

Hole Size: 14-Inch to 19 ft-bgs, 10-Inch from 19-45 ft-bgs

Datum:

Checked by: S. Treschow, P.G.

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PaDep Certification is PA 07-062



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Chambers Environmental

MARMON PLANT 4

629 East Rolling Ridge Drive

Project Number:

Project:

Reported:

Bellefonte PA, 16823

Project Manager:

Matt Whitman

Collector: JC

[none]

09/28/11 08:43

Number of Containers:

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB-65U-D	1114120-01	Water	09/13/11 09:30	09/14/11 13:40
SB-66U-D1	1I14120-02	Water	09/13/11 09:50	09/14/11 13:40
SB-67U-D	1I14120-03	Water	09/13/11 10:15	09/14/11 13:40
SB-76U-D	1I14120-04	Water	09/13/11 09:00	09/14/11 13:40
SB-78U-D1	1114120-05	Water	09/13/11 12:35	09/14/11 13:40
SB-81U-D	1114120-06	Water	09/13/11 12:00	09/14/11 13:40
SB-89U-D	1114120-07	Water	09/13/11 10:55	09/14/11 13:40
SB-89U-D1	1114120-08	Water	09/13/11 11:20	09/14/11 13:40

1I14120 Sample description revised. This report replaces report issued on 09/26/11 08:29. 09/28/11 acc.

Fairway Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Reviewed and Submitted by:

Michael P. Tyler Laboratory Director

Page 1 of 12

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Chambers Environmental

Project:

MARMON PLANT 4

629 East Rolling Ridge Drive

Project Number:

[none]

Reported:

Bellefonte PA, 16823

Collector: JC

09/28/11 08:43

Project Manager:

Matt Whitman

Number of Containers:

15. 0

Client Sample ID:

SB-65U-D

Date/Time Sampled:

09/13/11 09:30

Laboratory Sample ID:

1I14120-01 (Water)

		Laboratory Reporting		Date / Time			
Analyte	Result	Limit	Units	Analyzed	Method	Analyst	Note
Polychlorinated Biphenyls by EPA Method 8082					·		L10
PCB-1016	< 0.100	0.100	ug/l	09/21/11 15:08	EPA 8082	mt	
PCB-1221	< 0.250	0.250	ug/l	09/21/11 15:08	EPA 8082	mt	
PCB-1232	< 0.250	0.250	ug/l	09/21/11 15:08	EPA 8082	mt	
PCB-1242	< 0.250	0.250	ug/l	09/21/11 15:08	EPA 8082	mt	
PCB-1248	3.08	0.250	ug/l	09/21/11 15:08	EPA 8082	mt	
PCB-1254	< 0.250	0.250	ug/l	09/21/11 15:08	EPA 8082	mt	
PCB-1260	< 0.100	0.100	ug/l	09/21/11 15:08	EPA 8082	mt	
Surrogate: Tetrachloro-meta-xylene	101 %	70-	130	09/21/11 15:08	EPA 8082	mt	
Surrogate: Decachlorobiphenyl	116 %	70-	130	09/21/11 15:08	EPA 8082	mt	

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Chambers Environmental

629 East Rolling Ridge Drive

Bellefonte PA, 16823

Project Manager:

Matt Whitman

Project:

MARMON PLANT 4

Project Number: [none]

Collector: JC

Reported: 09/28/11 08:43

Number of Containers:

Client Sample ID:

SB-66U-D1

Date/Time Sampled:

09/13/11 09:50

Laboratory Sample ID:

1I14120-02 (Water)

		aboratory Reporting		Date / Time			
Analyte	Result	Limit	Units	Analyzed	Method	Analyst	Note
Polychlorinated Biphenyls by EPA Metho	od 8082						L10
PCB-1016	<0.100	0.100	ug/l	09/21/11 15:40	EPA 8082	mt	
PCB-1221	< 0.250	0.250	ug/l	09/21/11 15:40	EPA 8082	mt	
PCB-1232	< 0.250	0.250	ug/l	09/21/11 15:40	EPA 8082	mt	
PCB-1242	< 0.250	0.250	ug/l	09/21/11 15:40	EPA 8082	mt	
PCB-1248	3.64	0.250	ug/l	09/21/11 15:40	EPA 8082	mt	
PCB-1254	< 0.250	0.250	ug/l	09/21/11 15:40	EPA 8082	mt	
PCB-1260	< 0.100	0.100	ug/l	09/21/11 15:40	EPA 8082	mt	
Surrogate: Tetrachloro-meta-xylene	88.5 %	70-	130	09/21/11 15:40	EPA 8082	mt	
Surrogate: Decachlorobiphenyl	112 %	70-	130	09/21/11 15:40	EPA 8082	mt	

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629 East Rolling Ridge Drive

Bellefonte PA, 16823

Project Manager:

Matt Whitman

Project:

MARMON PLANT 4

Project Number: [none]

Reported:

Collector: JC

09/28/11 08:43

Number of Containers:

Client Sample ID:

SB-67U-D

Date/Time Sampled:

09/13/11 10:15

Laboratory Sample ID:

1I14120-03 (Water)

		Laboratory Reporting		Date / Time			
Analyte	Result	Limit	Units	Analyzed	Method	Analyst	Note
Polychlorinated Biphenyls by EPA Method 8082							L10
PCB-1016	< 0.500	0.500	ug/l	09/22/11 23:01	EPA 8082	bg	
PCB-1221	< 0.500	0.500	ug/l	09/22/11 23:01	EPA 8082	bg	
PCB-1232	< 0.500	0.500	ug/l	09/22/11 23:01	EPA 8082	bg	
PCB-1242	< 0.500	0.500	ug/l	09/22/11 23:01	EPA 8082	bg	
PCB-1248	6.85	0.500	ug/l	09/22/11 23:01	EPA 8082	bg	
PCB-1254	< 0.500	0.500	ug/l	09/22/11 23:01	EPA 8082	bg	
PCB-1260	< 0.500	0.500	ug/l	09/22/11 23:01	EPA 8082	bg	
Surrogate: Tetrachloro-meta-xylene	85.5 %	70-	130	09/22/11 23:01	EPA 8082	bg	
Surrogate: Decachlorobiphenyl	130 %	70-	130	09/22/11 23:01	EPA 8082	bg	S6

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Project:

MARMON PLANT 4

629 East Rolling Ridge Drive

Project Number:

[none]

Reported:

Bellefonte PA, 16823

Collector: JC 09/28/11 08:43

Project Manager:

Matt Whitman

Number of Containers:

Date/Time Sampled:

09/13/11 09:00

Client Sample ID:

Surrogate: Decachlorobiphenyl

SB-76U-D

1I14120-04 (Water)

Laboratory Sample ID: Laboratory Date / Time Reporting Limit Analyzed Result Units Method Analyte Analyst Note L10 Polychlorinated Biphenyls by EPA Method 8082 PCB-1016 < 0.100 0.100 ug/l 09/21/11 17:17 EPA 8082 mt PCB-1221 < 0.250 0.250 EPA 8082 ug/l 09/21/11 17:17 mt PCB-1232 < 0.250 0.250 ug/l 09/21/11 17:17 EPA 8082 mt PCB-1242 < 0.250 0.250ug/l 09/21/11 17:17 EPA 8082 mt PCB-1248 1.21 0.250 EPA 8082 ug/l 09/21/11 17:17 mt PCB-1254 < 0.250 0.250 09/21/11 17:17 EPA 8082 ug/l mt PCB-1260 < 0.100 0.100 ug/l 09/21/11 17:17 EPA 8082 mt 70-130 85.7% 09/21/11 17:17 Surrogate: Tetrachloro-meta-xylene EPA 8082 mt

70-130

119%

09/21/11 17:17

EPA 8082

mt

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MARMON PLANT 4

629 East Rolling Ridge Drive

Project Number:

Project:

Reported:

Bellefonte PA, 16823

Collector: JC

09/28/11 08:43

Project Manager:

Matt Whitman

Number of Containers:

Client Sample ID:

SB-78U-D1

Date/Time Sampled:

[none]

09/13/11 12:35

Laboratory Sample ID:

1I14120-05 (Water)

- -		Laboratory Reporting		Date / Time	_		
Analyte	Result	Limit	Units	Analyzed	Method	Analyst	Note
Polychlorinated Biphenyls by EPA Method 8082	<u>. </u>						L10
PCB-1016	< 0.100	0.100	ug/l	09/21/11 18:22	EPA 8082	mt	
PCB-1221	< 0.250	0.250	ug/l	09/21/11 18:22	EPA 8082	mt	
PCB-1232	< 0.250	0.250	ug/l	09/21/11 18:22	EPA 8082	mt	
PCB-1242	< 0.250	0.250	ug/l	09/21/11 18:22	EPA 8082	mt	
PCB-1248	1.92	0.250	ug/l	09/21/11 18:22	EPA 8082	mt	
PCB-1254	< 0.250	0.250	ug/l	09/21/11 18:22	EPA 8082	mt	
PCB-1260	< 0.100	0.100	ug/l	09/21/11 18:22	EPA 8082	mt	
Surrogate: Tetrachloro-meta-xylene	86.3 %	70-	130	09/21/11 18:22	EPA 8082	mt	
Surrogate: Decachlorobiphenyl	71.4 %	70-	130	09/21/11 18:22	EPA 8082	mt	

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629 East Rolling Ridge Drive

Bellefonte PA, 16823

Client Sample ID:

Project Manager:

Matt Whitman

Project:

Number of Containers:

MARMON PLANT 4

Project Number: [none]

Collector:

Reported:

JC

09/28/11 08:43

SB-81U-D

Date/Time Sampled:

09/13/11 12:00

Laboratory Sample ID:

1I14120-06 (Water)

		aboratory Reporting		Date / Time			
Analyte	Result	Limit	Units	Analyzed	Method	Analyst	Note
Polychlorinated Biphenyls by EPA Metho	od 8082						L10
PCB-1016	<1.00	1.00	ug/l	09/22/11 23:33	EPA 8082	bg	
PCB-1221	<1.00	1.00	ug/l	09/22/11 23:33	EPA 8082	bg	
PCB-1232	<1.00	1.00	ug/l	09/22/11 23:33	EPA 8082	bg	
PCB-1242	<1.00	1.00	ug/l	09/22/11 23:33	EPA 8082	bg	
PCB-1248	8.75	1.00	ug/l	09/22/11 23:33	EPA 8082	bg	
PCB-1254	<1.00	1.00	ug/l	09/22/11 23:33	EPA 8082	bg	
PCB-1260	<1.00	1.00	ug/l	09/22/11 23:33	EPA 8082	bg	
Surrogate: Tetrachloro-meta-xylene	88.5 %	70-	130	09/22/11 23:33	EPA 8082	bg	
Surrogate: Decachlorobiphenyl	98.0 %	70-	130	09/22/11 23:33	EPA 8082	bg	

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629 East Rolling Ridge Drive

Bellefonte PA, 16823

Project Manager:

Matt Whitman

Project: Project Number: MARMON PLANT 4

[none]

Reported:

Collector:

JC

09/28/11 08:43

Number of Containers:

Client Sample ID:

SB-89U-D

Date/Time Sampled:

09/13/11 10:55

Laboratory Sample ID:

1I14120-07 (Water)

	y sumple 121	`					
		aboratory Reporting		Date / Time		-	<u>-</u>
Analyte	Result	Limit	Units	Analyzed	Method	Analyst	Note
Polychlorinated Biphenyls by EPA Metho	d 8082						L10
PCB-1016	< 0.100	0.100	ug/l	09/21/11 19:26	EPA 8082	mt	
PCB-1221	< 0.250	0.250	ug/l	09/21/11 19:26	EPA 8082	mt	
PCB-1232	< 0.250	0.250	ug/l	09/21/11 19:26	EPA 8082	mt	
PCB-1242	< 0.250	0.250	ug/l	09/21/11 19:26	EPA 8082	mt	
PCB-1248	< 0.250	0.250	ug/l	09/21/11 19:26	EPA 8082	mt	
PCB-1254	< 0.250	0.250	ug/l	09/21/11 19:26	EPA 8082	mt	
PCB-1260	< 0.100	0.100	ug/l	09/21/11 19:26	EPA 8082	mt	
Surrogate: Tetrachloro-meta-xylene	82.1 %	70-	130	09/21/11 19:26	EPA 8082	mt	
Surrogate: Decachlorobiphenyl	116 %	70-	130	09/21/11 19:26	EPA 8082	mt	

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629 East Rolling Ridge Drive

Bellefonte PA, 16823

Project Manager:

Matt Whitman

Project:

MARMON PLANT 4

Project Number: [none]

Reported:

Collector: JC

09/28/11 08:43

Number of Containers:

Client Sample ID:

SB-89U-D1

Date/Time Sampled:

09/13/11 11:20

Laboratory Sample ID:

1I14120-08 (Water)

	J <u>1</u>					_	
	F	aboratory Reporting		Date / Time		-	
Analyte	Result	Limit	Units	Analyzed	Method	Analyst	Note
Polychlorinated Biphenyls by EPA Metho	od 8082						L10
PCB-1016	< 0.100	0.100	ug/l	09/21/11 19:59	EPA 8082	mt	
PCB-1221	< 0.250	0.250	ug/l	09/21/11 19:59	EPA 8082	mt	
PCB-1232	< 0.250	0.250	ug/l	09/21/11 19:59	EPA 8082	mt	
PCB-1242	< 0.250	0.250	ug/l	09/21/11 19:59	EPA 8082	mt	
PCB-1248	< 0.250	0.250	ug/l	09/21/11 19:59	EPA 8082	mt	
PCB-1254	< 0.250	0.250	ug/l	09/21/11 19:59	EPA 8082	mt	
PCB-1260	< 0.100	0.100	ug/l	09/21/11 19:59	EPA 8082	mt	
Surrogate: Tetrachloro-meta-xylene	78.0 %	70-	130	09/21/11 19:59	EPA 8082	mt	
Surrogate: Decachlorobiphenyl	109 %	70-	130	09/21/11 19:59	EPA 8082	mt	

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Chambers Environmental

Project:

MARMON PLANT 4

629 East Rolling Ridge Drive

Project Number:

Reported:

Bellefonte PA, 16823

Collector:

Project Manager:

Matt Whitman

Number of Containers:

[none]

JC

09/28/11 08:43

Notes

S6

Surrogate recovery out of range due to possible matrix interference.

L10

This sample was analyzed at a dilution due to the matrix. Reporting limits were adjusted accordingly.

CHAIN OF CUSTODY/

FAIRWAY LABORATORIES Environmental Laboratory

2019 9th Ave. P.O. Box 1925 Altoona, PA 16602

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Please print. See back of COC for instructions/terms and conditions.

Client Name:	Chan	were Euvinor	Rece	iving Inf	y Y	N	Ple	ase C	ircle	Prog	ram			Ana	alyses	Requ	ested				
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	53-67V	-D			1015		П		П		П				1						
	5B-76V	-0			0900)	П		T				-			 		1	1		
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•			Revis	sion 14				August 10, 201			Page 1 of 1
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Custody Seals?	<u>y (</u>	_ Intact	?						- 7	•	•
OC/Labels on bottl	es agree?	_□* c	orrect c	ontainers	s for all	the anal	ysis reque	sted?[☐ * Matrix:	WATE	<u>}-</u>
OC#	T		·	Nu	mber and	і Туре	of BOTT	LES	<u> </u>	Т	Comments
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ANALYTICAL RESULTS

Prepared by:

Prepared for:

Lancaster Laboratories 2425 New Holland Pike Lancaster, PA 17605-2425 Chambers Environmental 629 East Rolling Ridge Dr. Penn Eagle Industrial Park Bellefonte PA 16823

December 22, 2010

Project: Marmon - Plant 4

Submittal Date: 12/03/2010 Group Number: 1223970 PO Number: 08-061712 State of Sample Origin: PA

Client Sample Description

Lancaster Labs (LLI) #

SB-61U-D Summa Canister #239 Grab Air Sample SB-61U-D Summa Canister #162 Grab Air Sample

6156396

3B-010-D Sullillia Callister #102 Grad All Sample

6156397

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO

Chambers Environmental

Attn: Matt Whitman

Questions? Contact your Client Services Representative Megan A Moeller at (717) 656-2300 Ext. 1246

Respectfully Submitted,

Lat Moline.

Chad A. Moline Group Leader



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Page 1 of 1

Sample Description: SB-61U-D Summa Canister #239 Grab Air Sample

Marmon - Plant 4

LLI Sample # AQ 6156396 LLI Group # 1223970

10705 Account

Project Name: Marmon - Plant 4

Submitted: 12/03/2010 09:00

Reported: 12/22/2010 15:50

Collected: 12/02/2010 14:38 by MW

Chambers Environmental

629 East Rolling Ridge Dr.

Penn Eagle Industrial Park

Bellefonte PA 16823

-239-

CAT Analysis Name No.

CAS Number

79-01-6

As Received Final Result

MDT.

As Received

Final Result

DF

Volatiles in Air 05298 Trichloroethene EPA TO-15

mg/m3 N.D.

mg/m3 0.0011 ppm(v) N.D.

ppm(v)

MDT.

0.00020

MDL = Method Detection Limit

General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT Analysis Name Method

Trial# Batch#

Analysis Date and Time Analyst

Dilution

No.

EPA TO-15

1 C1034130AB

Factor

05298 VOCs in Air by EPA TO-15

12/09/2010 01:03

Michael A Ziegler



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Page 1 of 1

Sample Description: SB-61U-D Summa Canister #162 Grab Air Sample

Marmon - Plant 4

LLI Sample # AQ 6156397 LLI Group # 1223970 # 10705

Account

Project Name: Marmon - Plant 4

Collected: 12/02/2010 14:38 by MW

Submitted: 12/03/2010 09:00

Reported: 12/22/2010 15:50

Chambers Environmental

629 East Rolling Ridge Dr.

Penn Eagle Industrial Park

Bellefonte PA 16823

-162-

CAT

CAT Analysis Name No.

CAS Number

79-01-6

As Received Final Result

MDL

As Received Final Result

MDL

DF

Volatiles in Air 05298 Trichloroethene **EPA TO-15**

mg/m3 N.D.

mg/m3 0.0011 ppm(v) N.D.

ppm(v) 0.00020

MDL = Method Detection Limit

General Sample Comments

PA DEP Lab Certification ID 36-00037, Expiration Date: 1/31/11

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

Analysis Name

Method

Trial# Batch#

Analysis Date and Time Analyst

Dilution

Factor

05298 VOCs in Air by EPA TO-15

EPA TO-15

1 C1034130AB

12/09/2010 01:49

Michael A Ziegler



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Page 1 of 1

Quality Control Summary

Client Name: Chambers Environmental

Group Number: 1223970

Reported: 12/22/10 at 03:50 PM

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank <u>Result</u>	Blank <u>MDL</u>	Report <u>Units</u>	LCS %REC	LCSD <u>%REC</u>	LCS/LCSD <u>Limits</u>	RPD	RPD Max
Batch number: C1034130AB Trichloroethene	Sample number N.D.	er(s): 615 0.0011	6396-6156 mg/m3	397 95	96	70-130	1	25

*- Outside of specification

⁽¹⁾ The result for one or both determinations was less than five times the LOQ.

⁽²⁾ The unspiked result was more than four times the spike added.

Analysis Request/ Environmental Services Chain of Custody



For Lancaster Laboratories use only Acct. # 10705 Group# 1223970 Sample # 6156396-97 COC # 241159

Please print. Instructions on reverse side correspond with circled numbers. For Lab Use Only (5) Analyses Requested FSC: Matrix **Preservation Codes** SCR#: ____ Acct. #: ____ Project Name/#: Marnon - Planty PWSID #: Preservation Codes H=HCI T=Thiosulfate 6 Project Manager: Matt Whitna P.O.#: N=HNO₃ B=NaOH S=H₂SO₄ O=Other Quote #: _____ Sampler: Matt Whitner Composite Name of state where samples were collected: Date Time Sample Identification Collected Collected Remarks 5B-61U-D Turnaround Time Requested (TAT) (please circle): Normal Rush Refinquished by: Date Time (9 Date Time Received by: Rush TAT is subject to Lancaster Laboratories approval and surcharge.) Date results are needed: Relinguished by: Time Received by: Date Date Time Rush results requested by (please circle): Phone Fax E-mail Phone #:_____ Fax #: _____ Relinquished by: Time | Received by: E-mail address: Date Time Pata Package Options (please circle if required) SDG Complete? Type I (validation/NJ Reg) TX TRRP-13 Yes No Relinguished by: Time | Received by: Date Date Time Type II (Tier II) MA MCP CT RCP Type III (Reduced NJ) Site-specific QC (MS/MSD/Dup)? Yes No Type IV (CLP SOW) Relinquished by: Date Time | Received by: Date (If yes, indicate QC sample and submit implicate volume.) Type VI (Raw Data Only) Internal COC Required? Yes / No

> Lancaster Laboratories, Inc., 2425 New Holland Pike, Lancaster, PA 17601 (717) 656-2300 Fax: (717) 656-6766 Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client.

Issued by Dept. 6042 Management 2102.05



Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL N.D. TNTC	Reporting Limit none detected Too Numerous To Count	BMQL MPN CP Units	Below Minimum Quantitation Level Most Probable Number cobalt-chloroplatinate units
IU	International Units	NTU	nephelometric turbidity units
umhos/cm	micromhos/cm	ng	nanogram(s)
С	degrees Celsius	F	degrees Fahrenheit
meq	milliequivalents	lb.	pound(s)
g	gram(s)	kg	kilogram(s)
ug	microgram(s)	mg	milligram(s)
ml	milliliter(s)	ı	liter(s)
m3	cubic meter(s)	uľ	microliter(s)

- less than The number following the sign is the <u>limit of quantitation</u>, the smallest amount of analyte which can be reliably determined using this specific test.
- > greater than
- J estimated value The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).
- ppm parts per million One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.

Ingraphia Qualifiara

- ppb parts per billion
- **Dry weight**basis
 Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

U.S. EPA CLP Data Qualifiers:

	Organic Qualifiers		morganic Quainters
Α	TIC is a possible aldol-condensation product	В	Value is <crdl, but="" th="" ≥ldl<=""></crdl,>
В	Analyte was also detected in the blank	E	Estimated due to interference
С	Pesticide result confirmed by GC/MS	M	Duplicate injection precision not met
D	Compound quantitated on a diluted sample	N	Spike sample not within control limits
E	Concentration exceeds the calibration range of	S	Method of standard additions (MSA) used
	the instrument		for calculation
N	Presumptive evidence of a compound (TICs only)	U	Compound was not detected
P	Concentration difference between primary and	W	Post digestion spike out of control limits
	confirmation columns >25%	*	Duplicate analysis not within control limits
U	Compound was not detected	+	Correlation coefficient for MSA < 0.995
X,Y,Z	Defined in case narrative		

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Organia Qualifiera

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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QUALITY ASSURANCE PROJECT PLAN

REMEDIAL INVESTIGATION REPORT VOLUNTARY LAND RECYCLING PROGRAM (Act 2) PADEP FORMER CERRO METAL PRODUCTS COMPANY BELLEFONTE, PENNSYLVANIA

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QUALITY ASSURANCE PROJECT PLAN REMEDIAL INVESTIGATION REPORT VOLUNTARY LAND RECYCLING PROGRAM (Act 2) PADEP FORMER CERRO METAL PRODUCTS COMPANY BELLEFONTE, PENNSYLVANIA

INTRODUCTION

This Quality Assurance Project Plan (QAPP) presents the organizational structure, data quality objectives (DQOs), and data management plan for conducting the former Cerro Site Remedial Investigation field program. The QAPP is designed to assure that the precision. accuracy. representativeness. comparability, and completeness (the PARCC parameters) of the collected data are known. documented, and adequate to satisfy the DQOs of the study. The format and contents of the QAPP have been prepared to be consistent with the following United States Environmental Protection Agency (USEPA) guidance documents: "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" (USEPA 1983); "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA 1988); "Data Quality Objectives: Development Guidance for Uncontrolled Hazardous Waste Site Remedial Response Activities" (USEPA 1987); "NEIC Policies and Procedures" (USEPA 1986a): and "Region II CERCLA Quality Assurance Manual" (USEPA 1989a).

Laboratory analyses of the samples are anticipated to be performed by Centre Analytical Laboratories. Inc. located in State College, Pennsylvania or other equally qualified and certified laboratory, subject to the approval of the PADEP Project Manager. An analytical quality assurance program plan will be maintained on file with the selected laboratory.

SCOPE OF WORK

The scope of work for the Act 2 Remedial Investigation has been developed to complete evaluations of the groundwater flow regime, groundwater quality, and the hydraulic connection with Logan Branch and the shallow water-bearing zone at the site. The chemical characteristics of soil within the site including the hillsides and stream banks will also be evaluated. Detailed procedures for conducting the RI site investigations are provided in the RI Work Plan.

DATA QUALITY OBJECTIVES

Data obtained during the RI site investigation will he used to make decisions for a variety of purposes, including characterizing the quality of groundwater. surface water and soils at the former Cerro property and in Logan Branch and in assessing potential human health and environmental risks.

In order to best utilize the data generated during the site investigation, a clear definition of data objectives and procedures is required. This is accomplished through the development of DQOs which relate the extent and quality of data to be gathered during the investigation to their ultimate objective. DQOs are qualitative and quantitative goals for precision. accuracy, reproducibility. comparability, and completeness specified for each data set. DQOs for the former Cerro site investigation are provided in Table 1.

DQOs are based on the concept that different data uses may require different levels of data quality. DQOs are defined with respect to the types, numbers, and locations of samples that will be collected, and the quality assurance levels associated with the analysis. The guidance document "Data Quality Objectives: Development Guidance for Uncontrolled Hazardous Waste Site Remedial Response Activities" (USEPA 1987) has been used as an outline to determine the analytical levels required to obtain confidence levels that are appropriate for the intended data use. The analytical levels required for specific data uses and the types of analyses needed to achieve an analytical level are provided in Table 1.

Field data to be collected at the former Cerro site will include screening air at the drilling sites using an oxygen/explosimeter. Water levels will be measured in the field, as well as pH, temperature, turbidity, and specific conductance of water samples. Soil samples may be analyzed in the field for lead and zinc using an x-ray spectrometer. These data combined the data from numerous prior site investigations may be used to monitor the health and safety of field personnel, to assist in the determination of soil sampling locations and to assist in the determination of water sampling locations. Sampling methodologies are detailed in the RI Work Plan.

Laboratory analyses of samples collected at the former Cerro site will be performed following standard USEPA methods. The analytical data will have standard detection limits and documentation.

SAMPLE MATRICES, PARAMETERS, AND FREQUENCY OF COLLECTION

Two rounds of groundwater samples will be collected from existing on-site monitoring wells and new monitoring wells. Two rounds of surface-water and any spring samples will be collected. Soil and stream bank samples will also be collected at the site. Sampling protocols are described in the RI Work Plan. Sample matrices and analytical parameters are listed in Table 2. Also included in this table is the number of samples, field duplicates, field blanks, trip blanks and associated laboratory QA/QC samples that will be collected during the site investigation.

Groundwater samples collected during the first round of sampling will be analyzed by the laboratory for polychlorinated biphenyls (PCBs), VOCs, SVOCs, TPH, copper, lead and zinc. The parameters to be analyzed along with the corresponding quantitation limits are listed in Tables 3 and 4. In addition, pH, temperature, turbidity, and conductance will be measured in the field for each groundwater sample collected. The procedures for analyzing these field parameters are described in the RI Work Plan. The second round of groundwater samples will be collected after the first round data has been evaluated. The number of samples and types of analyses will be determined in consultation with the Pennsylvania Department of Environmental Resources (PADER).

Soil samples and stream bank samples will be collected and analyzed for PCBs, VOCs, SVOCs, TPH, copper, lead and zinc. Surface-water samples collected during the first round of sampling will be analyzed for PCBs, VOCs, SVOCs, TPH, copper, lead and zinc. Surface-water samples will be collected during the second sampling round after the first round data has been evaluated. The number of samples and types analyses will be determined in consultation with the PADER.

The methods provided in "Test Methods for Evaluating Solid Waste" (SW-846) will be followed by the laboratory for all the PCB, VOC, SVOCs, TPH and metal analyses. Analytical procedures are described in more detail in the Section entitled Analytical Procedures of this

procedures are described in more detail in the Section entitled Analytical Procedures of this QAPP.

Quantitation limits for the organic and inorganic parameters to he analyzed are provided in Tables 3 and 4; however, dilution or interference effects may make it necessary to adjust these limits. The laboratory will make every effort to achieve quantitation limits as low as practicable and will report estimated concentration values at less than the detection limit by flagging the value with J.

PROJECT ORGANIZATION AND RESPONSIBILITIES

The project organizational structure is discussed in the RI Work Plan. The responsibilities of the primary personnel involved in the project are detailed below.

- The RI Project Director is responsible for overseeing the implementation of the site investigation. To the maximum extent possible, all documents, including reports, approvals and other correspondence concerning the activities performed will be directed through the project director. Raymond J. Avendt PhD PE is the RI Project Director.
- The Project Manager is responsible for the following: sampling QC; overall project coordination; adherence to the project schedules; directing, reviewing, and assessing the adequacy of the performance of the technical staff and subcontractors assigned to the project; interacting with the project director; preparing the reports; and maintaining full and orderly project documentation. Matt Whitman is the Project Manager.
- The Project QA/QC Officer is responsible for performing systems auditing, and for providing independent data quality review of project documents and reports. The project QA/QC Officer is Raymond J. Avendt PhD PE.
- The Engineering Task Manager is responsible for coordinating all potential engineering tasks. The Engineering Manager is yet to be named.
- The Risk Assessment Task Manager is responsible for all risk assessment field activities and overseeing the preparation of the risk assessment reports. The Risk Assessment Manager is yet to be named.
- The Project Hydrogeologist and Field Staff are responsible for coordination of the activities of field personnel and of the drilling, laboratory, and surveying subcontractors: adherence of the field work to the procedures specified in the QAPP and Work Plan: and rigorous documentation of the field work. The field hydrogeologist is also designated as the site safety officer. The Project Hydrogeologist

- The Project Chemist is responsible for review of laboratory data for compliance with the QA objectives for the PARCC parameters and notifications to the project manager of any QC deficiencies.
- The Project Support Team members include the sampling team and support staff (e.g., data processors, secretaries, and in-house experts in hydrogeology, chemistry, etc.) who are responsible for the technical direction and adequacy of the work in their respective areas of specialty which are or may be required to meet the project objectives.

Tasks that will be performed by subcontractors include drilling, surveying, and analytical (laboratory) testing. The internal project organizational structure within the laboratory is described in the laboratory QAPP.

QUALITY ASSURANCE/QUALITY CONTROL

The overall QA objective is to develop and implement Procedures for field measurements, sampling, and analytical testing that will provide data of known quality that is consistent with the intended use of the information. This Section defines the objectives by (1) describing the use of the data: (2) specifying the applicable QC effort (field checks and analytical support levels): and (3) defining the QC objectives (data quality acceptance criteria).

DATA USAGE AND REQUIREMENTS

The field measurements and laboratory analyses will be used to support one or more steps in the site investigation process. The field steps will address the site-related constituents in soil, groundwater, and surface water at the site. The intended uses of the data from each of the site investigation activities are summarized in Table 1. The data to be collected range from qualitative information (based on field observations) to quantitative laboratory analyses.

LEVEL OF QUALITY CONTROL EFFORT

The sampling team will use several types of QA/QC samples to ensure and document the integrity of the sampling procedures, laboratory sample handling procedures, and the validity of

the measurement data.

Field replicate samples will be collected to evaluate the reproducibility of the sampling technique. Replicate samples will be collected at a rate of one for every 20 aqueous samples. Since the replicate will be "blind" to the laboratory, it will have a coded identity on its label and on the chain-of-custody record form. The actual sampling location will be recorded on a daily log form and on the water sampling log form.

Analyte-free water will be obtained from the laboratory to be used for collecting field blanks, and the final decontamination rinse, where required. If necessary, this water can be verified as being analyte-free by reviewing the analytical results of method blanks run by the laboratory on the days the field blanks were prepared and shipped. Protocols for the collection of field blanks and decontamination of equipment are provided in the appropriate appendices of the Work Plan. Because none of the samples collected during the site investigation will be analyzed for volatile organic compounds, trip blanks are not required.

Field blanks will be prepared to determine if cross-contamination has occurred during sampling. Two sets of identical bottles, one set containing analyte-free water and one empty set will be provided by the laboratory. The analyte-free water from the one set of bottles is passed over the field sampling device(s) and collected into the empty set of bottles. Field blanks will he preserved in the same manner as the samples. Field blanks for the nonaqueous and surface-water samples will be prepared for each day of sampling. For the groundwater samples, one field blank will be prepared at the beginning of each sampling round because disposable hailers will he used to collect these samples. The field blank will be analyzed for the same parameters as the associated samples.

All field blank water will be shipped with the sample containers. Blanks and the associated samples will be held on-site for no longer than two calendar days. All blanks and samples will be maintained at 4 degrees Celsius while stored on-site and during shipment. Sample bottles and blanks will be handled in the same manner prior to their return to the laboratory.

The laboratory will follow standard QC measures to provide data of known and defensible quality. The data quality elements that will be checked and documented include the PARCC parameters which are discussed separately below.

Precision

Measurements of data precision are necessary to demonstrate the reproducibility of the analytical data. Precision of the sample data will be determined from the analyses of matrix spike and matrix spike duplicates (MS/MSD5). MS/MSD samples will be collected at a frequency of 1 per 20 samples collected (one MS and one MSD per 20 samples per matrix. or one MS/MSD pair per 2-week period per matrix. An extra sample volume will de collected for each replicate and MS/MSD sample taken. MS/MSD samples will be labeled on the sample container and appropriate sample log and chain-of-custody forms. Laboratory precision requirements are set by the analytical methods used.

Accuracy

Accuracy is the relationship of the reported data to the "true" value. The accuracy of the methods used for the analyses of the samples will be evaluated through the use of calibration standards, MS/MSD analyses, and surrogate spikes. As indicated above. MS/MSD samples will he collected and analyzed at a frequency of 1 per 20 samples, or one MS/MSD pair per 2-week period per matrix. An extra sample volume will be collected for each MS/MSD sample taken. Laboratory accuracy requirements are set by the analytical materials used.

Representativeness

The sampling procedures employed during the site investigation are designed to provide data that are representative of actual conditions at the sampling location. Considerations for evaluating the representativeness of the data include, but are not limited to, the following: the sampling location; the methods used to obtain samples at the site; and the appropriateness of the analytical method to the type of sample obtained. All field sampling activities will be performed following the procedures described in the Work Plan.

Comparability

Comparability expresses the confidence with which one data set can be compared with another data set. The extent to which existing and planned analytical data will be comparable depends on the similarity of sampling and analytical methods. The procedures used to obtain the

analytical data, as documented in the QAPP, are expected to provide comparable data. These new analytical data, however, may not be directly comparable to existing data because of differences in procedures and QA objectives.

Completeness

Completeness is a measure of the amount of data obtained from a specific measurement that is judged to be valid as compared to the total amount of data collected. The validity of the collected data will be evaluated utilizing the guidelines discussed in Section Data Reduction, Validation, and Reporting. The laboratory should provide data that meet QC acceptance criteria for 90 percent or more of the requested determinations. If the percent completion limits are not met, the laboratory may be required to re-analyze samples or re-sampling may be required.

QUALITY CONTROL OBJECTIVE

The purpose of QC check samples is to determine if the data are of acceptable quality. Several different types of QC check samples will be analyzed and the results will be compared to data quality acceptance criteria and/or QC control limits that are specified for each method. The laboratory will routinely run these QC samples in accordance with the protocols and frequencies specified in the analytical methods used. The QC check samples include the following:

- Blank samples
 - Preparation
 - Method
 - Holding
 - Calibration
- Initial and continuing calibrations
- Surrogate spikes
- Matrix spikes/analytical spikes
- Duplicate samples
- Control samples

The specific types and frequencies of QC checks which will be performed in support of each test method, the calibration procedures for each instrument, and the QC control limits and/or data quality acceptance criteria for each of the types of QC check samples, are set by the

analytical method used.

SAMPLING PROCEDURES

Samples will be collected in accordance with the sampling procedures provided in the Work Plan. These procedures include the following:

- Monitoring well installation.
- Collection of ground-water samples.
- Collection of surface water samples.
- Collection of soil samples.
- Collection of stream bank samples.
- Measurement of water levels.

The sampling protocols provide detailed step-by-step procedures for sample collection and address the following as appropriate:

- Use of sampling equipment.
- Decontamination of sampling equipment.
- Pre-sampling requirements (well evacuation volumes).
- · Field screening procedures.
- Field analysis procedures (lead, zinc, pH, temperature, turbidity, and specific conductance).
- Field QC check sample collection procedures (blanks, rinsates, replicates).
- Sample packaging and shipment.
- Sampling documentation and chain-of-custody.

All samples will be delivered to the laboratory within 24 hours from time of collection. Preservation, container, and holding time requirements for the parameters to be analyzed are listed in Table 5.

SAMPLE CUSTODY

A chain-of-custody record will be maintained for each sample collected and will provide an

accurate written record that can be used to trace the possession of samples from collection through analysis and reporting. Sample bottles to be used for this project will be selected, prepared, and quality-controlled according to OSWER Directive #9240-0-005 "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers" (US EPA 1 989b).

The procedures that will be followed to provide the chain-of-custody in the field from sample collection through shipment to the laboratory (including sample preservation) are specified in the Work Plan. The procedures that will be used to continue the chain-of-custody for each sample from its arrival at the laboratory through analysis and reporting will be performed according to the laboratory QAPP. The laboratory sample custody procedures conform to US EPA guidelines. The project samples will be retained by the laboratory until the holding times are exceeded, or until permission to discard is received.

CALIBRATION PROCEDURES

The calibration procedures for field instrumentation are discussed in the Work Plan. These procedures are described for the following instruments:

- Water-level recorder (M-scope).
- LEL meter.
- pH meter.
- Specific conductance/temperature meter.
- Portable x-ray spectrometer.
- · Turbidity Meter.

The calibration procedures for laboratory instrumentation will be performed in accordance with those specified by the analytical method and the laboratory QAPP.

ANALYTICAL PROCEDURES

The methods to be followed for the analysis of PCBs, copper, lead, and zinc are found in

USEPA SW-846 (USEPA 1992) and listed in Tables 3 and 4. The types and frequencies of QC checks will be those specified in the analytical methods described in the Section entitled Quality Control Objectives of this QAPP.

DATA REDUCTION, VALIDATION, AND REPORTING

All data collected during the site investigation, including field and laboratory results, will he reduced, reviewed, summarized, and reported. The reduction of the field data will consist of summarizing the raw field data, which may be presented in the form of tables, logs, illustrations, and graphs, as deemed appropriate by the Project Manager. The analytical data from the laboratory will be reduced to appropriate forms as determined by the Project Manager. All data will be maintained at the Act 2 Project office at the former Cerro Metal Products Company facility until acceptance of final reports.

The sample data collected will be screened for completeness and technical compliance. All data packages provided by the laboratory will consist of Level II deliverables as specified in the Analytical Quality Assurance Guidance Manual. A copy of the Level II reporting requirements are provided in Appendix A. The review of the data will include:

- Checking to see if the field chain of custody form was filled out properly and if' the samples were logged properly.
- Checking to see if the correct parameters were analyzed using the methods identified in the QAPP.
- Checking to see if the holding times were met for each parameter analyzed.
- Reviewing the blank results. If compounds are detected in the blanks, the reasons for this will be investigated.

If the data appear suspect, specific data of concern will be investigated. On the basis of this review, the data validator (Project Chemist) will make judgments and comments on the quality and limitations of the data. The data validator will prepare documentation of his or her review and conclusions to summarize any overall deficiencies that require attention. General laboratory performance will also be assessed by the data validator.

The data validator will inform the Project Manager of data quality and limitations. and assist in interacting with the laboratory to correct any data omissions and/or deficiencies. The laboratory may be required to rerun or resubmit data depending on the extent of the deficiencies and importance in meeting the DQOs within the overall context of the project.

The reviewed laboratory data will be reduced and tabulated. The tabulated format will be suitable for inclusion in the site investigation report and will be designed to facilitate comparison and evaluation of the data. The data tabulations will be sorted by classes of constituents (PCBs, VOCs, SVOCs, TPH and metals). Each table will contain the following information: sample number; matrix: analytical parameters: detection limits; concentrations detected; and qualifiers, as appropriate.

The field measurement data will be similarly reduced into a tabulated format suitable for inclusion in the site investigation report and will be designed to facilitate comparison and evaluation for the data. These tabulations may include but not be limited to the following information:

- Field screen results.
- Field analyses (lead, zinc. pH, temperature, and specific conductance).
- Well construction details.
- Water-level measurements and surveyed measuring point elevations.

Field logs will be transferred into typed formats or organized in their original form for inclusion in the site investigation report as appendices. The following log forms will he used:

- Sample/Core Logs.
- Construction Logs.
- Water Level Logs.
- Water Sampling Logs.
- Water Level/Pumping Test Record Logs.
- Soil Sampling Logs.

The tables and logs will be compiled whenever feasible by the field hydrogeologist, who

will inform the project manager of any problems encountered during data collection, identify apparent inconsistencies, and provide opinions on the data quality and limitations. The tables and logs will be used as the basis for data interpretation and will be checked against the original field documentation by an independent reviewer prior to inclusion in the site investigation report.

INTERNAL QUALITY CONTROL

The field hydrogeologist will make use of the following types of QA/QC samples to ensure and document the integrity of the sampling procedures and the validity of the measurement data: field replicates and field blanks. The frequencies for collecting the QA/QC samples are specified in the Section entitled Level of Quality Control Effort of this QAPP. The procedures for collecting the QA/QC samples are specified in the Work Plan. The QA/QC sample results will he compared to acceptance criteria, and documentation will be performed showing that these criteria have been met. Any samples in nonconformance with the QC criteria will he identified and reanalyzed by the laboratory, if appropriate.

Two types of quality assurance mechanisms are used to ensure the laboratory production of analytical data of known and documented quality: analytical method QC, and program QA. The internal quality control procedures for the analytical services on samples to be provided are specified in the analytical methods and the laboratory QAPP. These specifications include the types of control samples required (sample spikes, surrogate spikes, reference samples, controls, blanks), the frequency of each control, the compounds to be used for sample spikes and surrogate spikes, and the quality control acceptance criteria. The laboratory will be responsible for documenting that both initial and ongoing instrument and analytical QC criteria are met in each package. This information will be included in the case narrative of the packages generated by the laboratory and will be evaluated during the review performed by the Project Director.

PERFORMANCE AND SYSTEM AUDITS

System audits will be performed on a periodic basis, as appropriate, to assure that the site investigation field program is conducted in accordance with the approved project plan. Examples

of systems audits that will be performed by the Project Director and other senior project personnel during the site investigation are as follows:

- The Field Hydrogeologist will supervise and check on a daily basis the following tasks: that the groundwater program and other field programs are conducted correctly; that monitoring wells are installed and developed correctly; that field measurements are made accurately; that equipment is thoroughly decontaminated: that samples are collected and handled properly; and that all field work is accurately and neatly documented. QA checklists will be filled out daily during drilling, installation, and development of the new monitoring wells, and during the sampling programs. The QA daily checklists for these activities are provided in the Work Plan.
- On a timely basis, the Data Validator will review the data package submitted by the laboratory to check the following information: that all requested analyses were performed; that sample holding times were met; that the data were generated using the appropriate methodology, level of QC effort and reporting; and that the analytical results are in conformance with the prescribed acceptance criteria. The Data Validator will evaluate the data quality and limitations on the basis of these factors.
- The Project Manager will oversee the field hydrogeologist and data validator, and check that the management of the acquired data proceeds in an organized and expeditious manner.
- Audits of the laboratory are performed on a regular basis by regulatory agencies and are discussed in the laboratory QAPP.

PREVENTIVE MAINTENANCE

The various consultants and field sampling companies retained for the Act 2 RI work have established programs for the maintenance of field equipment to ensure the availability of equipment in good working order when and where it is needed, as indicated in the following examples:

- An inventory of equipment, including model and serial number, quantity, and condition will be maintained. Each item will be tagged and signed omit when in use, and its operating condition and cleanliness will be checked upon return. Routine checks will he made on the status of equipment, and spare parts will be stocked. An equipment manual library will also be maintained.
- The Field Hydrogeologist is responsible for ensuring that the equipment is tested, cleaned, charged, and calibrated in accordance with the manufacturer's instructions before it is used in the field.

The laboratory also follows a well-defined program to prevent the failure of laboratory equipment and instrumentation. This preventive maintenance program is described in the laboratory QAPP.

DATA ASSESSMENT PROCEDURES

The field- and laboratory-generated data will be assessed for the PARCC parameters. Both quantitative and qualitative procedures will be used for these assessments. The criterion for assessment of field measurements will be that the measurements were taken properly using calibrated instruments. Assessment of the sampling data with respect to field performance will be based on the criteria that the samples were properly collected and handled. Field QC check sample results will also be considered in assessing the representativeness and comparability of the samples collected. The project manager will have overall responsibility for data assessment and integration of that assessment into data use and interpretation.

The QC acceptance criteria prescribed for each test method are presented in the laboratory QAPP. Rigorous QA/QC procedures will be followed for the collection of samples. The sampling protocols will be strictly adhered to in order to maintain consistency in sampling.

CORRECTIVE ACTIONS

The QA/QC program contained in this QAPP will enable problems to be identified, controlled, and corrected. Potential problems may involve non-conformance with the SOPs and/or analytical procedures established for the project, or other unforeseen difficulties. Any persons identifying an unacceptable condition will notify the field hydrogeologist, where applicable, and/or the project manager. The project manager, with assistance from the project QA/QC manager, will be responsible for developing and initiating appropriate corrective action and verifying that the corrective action has been effective. For laboratory analysis, both the identified deviations and corrective actions will be documented on the Corrective Action report.

Corrective actions may include repeating measurements, resampling and/or reanalysis of samples, and amending or adjusting project procedures. If warranted by the severity of the

problem (e.g., if monitoring wells require resampling or if the project schedule may be affected). the PADER project manager will be notified. Additional work, which is dependent upon an unacceptable activity, will not be performed until the problem has been eliminated.

QUALITY ASSURANCE REPORTS

Regular QA reporting throughout the duration of the project, as well as reporting on an asneeded basis will include the following:

- Conference calls and/or meetings will be scheduled if requested by the project coordinator or by the PADER remedial project manager to discuss any concerns that may arise during the course of the site investigation field program that might require significant corrective actions, changes to the scope of work, or departures from the approved project SOPs.
- Serious deficiencies in sampling and/or monitoring data will be reported to the PADER as soon as practicable after such deficiencies have been noted.

The laboratory's internal QA reporting is described in the laboratory QAPP.

REFERENCES

- U.S. Environmental Protection Agency (USEPA). 1983. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans. QAMS-005/X0.
- U.S. Environmental Protection Agency (USEPA). 1986a. NEIC Policies and Procedures. EPA-330/9-78-00 1 -R.
- U.S. Environmental Protection Agency (USEPA). 1987. Data Quality Objectives: Development Guidance for Uncontrolled Hazardous Waste Site Remedial Response Activities. OSWER Directive 9355.0-7B. Washington D.C.: hazardous Site Control Division.
- U.S. Environmental Protection Agency (USEPA). 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.
- U.S. Environmental Protection Agency (USEPA). 1989a. Region II CERCLA Quality Assurance Manual, Revision I.
- U.S. Environmental Protection Agency (USEPA). 1989h. Specifications and Guidance for Obtaining Contaminant-Free Sample Containers. OSWER Directive 9240.0-005.
- U.S. Environmental Protection Agency (USEPA). 1992. Test Methods for Evaluating Solid Waste (SW-846), Third Edition, Revision 1.

Table 1, Summary of Data Quality Objectives and Anaytical Levels for Former Cerro Metal Products Company Act 2 RI

Area	Data Collection Activities	Media	Sample Location	Number of Samples / Data Points*	Analyses	Analytical Method **	Objectives / Rationale
Plant 4 - Norti	hern					INCOTOG	Rauonale
Plant 4 - Sout	thern Soli Sampling	Soil	See Plant 4 Area Drawings Un-Biased Samples 100 ft. Uniform Grid	33 Locations Below pavement and @ Above Saturated Soils a SB 57U thru SB 89U	Metals, VOC's, TPH, PCB's	VOC'S SW 846 8260 SVOC'S SW846 82700 TPH SW 8015 DR	Assuming depth to bedrock of >24 ft.; B three samples will be taken at each location. C 0-6in. Surficial; 96-102" and 280-286"
		Soil	See Plant 1 Area Drawing 4 of 4 Biased Sample Area / Concern 1 AST Oil Storage 2 Hydraulic Oil Storage 3 Hydraulic Oil for Billet Heaters 4 Hydraulic Oil for Billet Heaters 5 Raw Material Storage Area		.		33 unbiased locations x 3 samples = 99 samples O Oils Storage Area 5 biased locations x 3 samples = 15 samples
	Groundwater	Water	To Be Determined	TBD	Metals, VOC's. SVOC's, TPH, PCB's		TBD
outh Yard	Soil Sampling	Soil	See South Yard Area Drawing Un-Biased Samples 100 ft. Uniform Grid	6 Locations Below pavement and @ Above Saturated Soils as SB 90U thru SB 95U	Metals, VOC's, SVOC's, TPH, PCB's	VOC's SW 846 82608 SVOC's SW846 82700 TPH SW 8015 DRO	Assuming depth to bedrock of >24 ft.; 3 three samples will be taken at each location.; 5 0-5in. Surficial; 96-102" and 280-286" 6 unbiased locations x 3 samples = 18 samples
	Sediment Traps	Sediment	See South Yard Area Drawing	Composite each trap	Metals		South Yard Area has 3 locations of sediment traps One composite sample each of 3 traps.
	Hwy. 144 Stormwate	r Catchbasins	See Hillside Aerial Maps	Composite each trap	Metals		Chambers to determine number of catchbasins by field inspection.
	Groundwater	Water	To Be Determined	Dat	Metals, VOC's. SVOC's, TPH, PCB's		TBD

Not including QA/QC samples
The PQL's are as specified in most current version of EPA RCRA Manual SW-846

Table 1, Summary of Data Quality Objectives and Anaytical Levels for Former Cerro Metal Products Company Act 2 RI

Area	Data Collection Activities	Media	Sample Location	Number of Samples / Data Points*	Analyses	Analytical Method **	Objectives /
Plant 1	Soil Sampling	Soil	See Plant 1 Area Drawing 4 of 4 Un-Biased Samples 100 ft. Uniform Grid	23 Locations Below pavement and @ Above Saturated Soils a SB 26U thru SB 48U	Metals, VOC's, TPH, PCB's and Top of Rock	Metals RCRA 8 6020 VOC's SW 846 82601 SVOC's SW846 82700 TPH SW 8015 DRO	Assuming depth to bedrock of >24 ft.; 3 three samples will be taken at each location. 5 0-6in. Surficial; 96-102" and 280-286" 23 unbiased locations x 3 samples = 69 sample
		Soil	See Plant 1 Area Drawing 4 of 4 Biased Sample Area / Concern 1 2,000 Gal UST Guard House 2 Fuel Oil AST's @ Bridge 3 Automatics Degreaser 4 Pickle Line 5 Pickle Line 6 Pickle Line 7 Pickle Line Near Tumbler	7 Locations Below pavement and 0-6", 96-102" and 280-286 SB 15B thru SB 21B	S'TPH and Pb TPH VOC's and SVOC's Metals Metals Metals Metals, VOCs & SVOCs		No records reguarding tank closure No records reguarding tank closures Plant1 had reported degreaser No records reguarding tank condition and/or secondary containment " This pickle line has degreasing 7 biased locations x 3 samples = 21 samples
	Groundwater	Water	To Be Determined	TBD	Metals, VOC's. SVOC's, TPH, PCB's		TBD
	Surface Water	Water	To Be Determined	TBD	Metals, VOC's, SVOC's, TPH, PCB's		TBD
fices & Spri			· · · · · · · · · · · · · · · · · · ·				
	Soil Sampling	Soil	See Spring Area Drawing Un-Blased Samples 100 ft. Uniform Grid	8 Locations Below pavement and @ Above Saturated Soils at SB49U thru SB56U	Metals, VOC's, TPH, PCB's	VOC's SW 846 8260B SVOC's SW846 8270C TPH SW 8015 DRO	Assuming depth to bedrock of >24 ft.; three samples will be taken at each location. 0-6in. Surficial; 96-102" and 280-286" 8 unbiased locations x 3 samples = 24 samples

Not including QA/QC samples
The PQL's are as specified in most current version of EPA RCRA Manual SW-846

Table 1, Summary of Data Quality Objectives and Anaytical Levels for Former Cerro Metal Products Company Act 2 RI

Area North Yard	Data Collection Activities	Media	Sample Location	Number of Samples / Data Points*	Analyses	Analytical Method **	Objectives /
North Yard	Soil Sampling	Soil	See North Yard Area Drawing 4 of 4 Un-Biased Samples 100 ft. Uniform Grid	25 Locations Below pavement and @ 5 ft. Horizons SB 1U thru SB 25U	Metals, VOC's, TPH, PCB's	Metais RCRA 8 6020 VOC's SW 846 8260 SVOC's SW846 82700 TPH SW 8015 DR	Assuming depth to bedrock of 16 ft.; B four samples will be taken at each location. C 0-6in. Surficial; 60-66"; 120-126" and 180-186" D 25 unbiased locations x 4 samples = 100 samples
		Soil	See North Yard Area Drawing 4 of 4 Biased Sample Area / Concern 1 WWTP Empty Drum Storage 2 WWTP Sludge 3 PCB HW Storage 4 Former Drum Storage 5 Fuel Oil AST's 6 Empty Drum Storage 7 Former NO3 AST 8 Boiler House Material Storage 9 Boiler House Coal Sito 10 Plant 6 Septic Tank 11 Plant 6 Degreaser 12 Plant 6 AST 600 gal. 13 Plant 6 Pickling Tanks 14 Plant 6 UST 2,000 gal.	SB 1B thru SB 14B	Metals, VOC's. SVOC's, TPH, PCB's Metals PCB's Metals, VOC's. SVOC's, TPH, PCB's TPH Metals, VOC's. SVOC's, TPH, PCB's Metals TPH Metals, VOC's, SVOC's VOC's, SVOC's VOC's, SVOC's TPH Metals TPH, Metals TPH, Pb		Unknown historical drum contents Cu, Pb and Zn sludges reported stored on-site HW Storage shed Unknown historical drum contents Current soil staining Unknown historical drum contents Acidified soils may leach metals Reported fuel storage Trace metals and PAH's from coal Plant 6 had reported degreaser 1950"s Plant 6 had reported degreaser 1950"s Reported AST on historical dwgs. Acidic tanks on floor in historical dwgs. Historical records show UST 14 biased locations x 4 samples = 56 samples
	Sediment Traps	Sediment	See North Yard Area Drawing 4 of 4	Composite each trap	Metais, TPH		North Yard Area has 5 locations of sediment tra One composite sample each of 5 traps.
	Stream Bank	Soil	Non-remediated Areas 200 ft. spacing	Native soils	Metals, TPH, PCB's		Approximately 1,200 ft. of exposed bank. one sample each 200 ft. = 6 samples
	Groundwater	Water	To Be Determined	TBD	Metals, VOC's, SVOC's, TPH, PCB's		TBD
	Surface Water	Water	To Be Determined	TBD	Metals, VOC's. SVOC's, TPH, PCB's		TBD

Not including QA/QC samples

The PQL's are as specified in most current version of EPA RCRA Manual SW-846

Table: -2. Summary of Analytical Parameters and Quality Control Samples for the Site Investigation at the Cerro Metal Products Company Facility, Bellefonte, Pennsylvania.

Matrix	Frequency of Sample Collection	Number of Samples	Field Replicates	Field Blanks	MS/(1) MSD	Test Person stars (2)
Soil	Once	151	0	l per day	7	Test Parameters (2) PCBs, copper, lead, zinc
Stream Bank	Once	60	0	l per day	3	PCBs
		30	0	l per day	2	Copper, lead, zinc
Groundwater - First Round	Twice (3)	23	2	1	2	PCBs (filtered), copper (filtered), lead (filtered), zinc (filtered
		15	1	1	1	PCBs, copper, lead, zinc
Surface Water - First Round	Twice (3)	16	1	l per day	1	PCBs. copper. lead. zinc

Matrix spike/matrix spike duplicate (MS/MSD) analysis is performed on a site sample and therefore is not counted as a separate sample. (1) For MS/MSD's, triple sample volume will be provided. (2)

All analyses will be performed in accordance with USEPA SW-846.

The number of samples to be collected and the parameters to be analyzed for during the second round will be determined after the first (3)

PCBs Polychlorinated biphenyls.

Table 3. Polychlorinated Biphenyls to be Analyzed for During the Site Investigation at the Cerro Metal Products Company Facility, Bellefonte, Pennsylvania.

Estimated Quantitation Limit*

Compound	Method Reference Number	Water (ug/L)	Soil (ug/kg)
Aroclor-1016	8080	5	0001
Aroclor-1221	8080	5	1000
Arocior-1232	8080	5	1000
Aroclor-1242	8080	5	1000
Aroclor-1248	8080	5	1000
Aroclor-1254	8080	5	1000
Aroclor-1260	8080	5	1000

* Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, are calculated on a dry weight basis as required by the contract and may be higher.

Finalization of the estimated quantitation limits will be determined after the laboratory has been designated.

Table 4. Metals to be Analyzed for During the Site Investigation at the Cerro Metal Products Company Facility, Bellefonte, Pennslyvania,

		Estimated Quantitation Limit*		
Metal	Method Reference Number	Water (ug/L)	Soil (ug/kg)	
Copper	6010	0.01	500	
Lead	7421	0.001	50	
Zinc	6010	0.005	250	

* Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, are calculated on a dry weight basis as required by the contract, and may be higher.

Finalization of the estimated quantitation limits will be determined after the laboratory has been designated.

Table 5. Summary of Sample Preservation and Container Specifications for the Site Investigation at the Cerro Metal Products Company Facility, Bellefonte, Pennsylvania.

<u>Matrix</u> Water	<u>Parameter</u>	Sample Container (a)	Chemical Preservative (b)	Holding Time (c)
	Polychlorinated biphenyls	1 liter glass bottle.	None	Extraction-7 days Analysis-40 days following extraction
Soil	Metals	I liter plastic bottle.	Nitric acid to pH<2	l 80 days
	Polychlorinated biphenyls	250 milliliter glass bottle.	None	Extraction-7 days Analysis-40 days following extraction
	Metals	250 milliliter glass bottle.	None	180 days

 ⁽a) Sample containers will be of demonstrated cleanliness as described in the Laboratory Quality Assurance Program Plan.
 (b) Samples will be cooled to approximately 4 degrees Celsius.
 (c) Starts from time of collection.

APPENDIX A

LEVEL II LABORATORY QUALITY ASSURANCE REQUIREMENTS

LABORATORY REPORTABLES

The following information will be included in the data package for each sample where applicable:

General Information

- 1. The results of sample analysis;
- 2. The parameters of interest;
- 3. The method of analysis;
- 4. The detection limits of analysis;
- 5. For large numbers of samples per report, a master list of laboratory tracking ID numbers correlated with field sample ID numbers and sample analysis batch identification to correlate QA samples to sample analysis batch;
- 6. Sample collection date;
- Sample received date;
- 8. Sample preparation/extraction date;
- 9. Sample analysis date;
- 10. Copy of the chain-of-custody form signed by the laboratory sample custodian;
- 11. A narrative summary identifying any QA or sample problems encountered, required sample manipulations (dilutions), and the corrective action taken.

LEVEL II REPORTABLES

Inorganic Analyses

For inorganics analyses involving the use of atomic absorption (flame or furnace), inductively coupled plasma (ICP), ion chromatograph (IC), light (visible or ultraviolet),

spectrophotometric methods, other turbidimetric, gravimetric, auto analyzer procedures and inorganic procedures generally referred to as "wet bench" chemistry, the following QA data should be provided where applicable:

- 1. Results of method blanks;
- 2. Results of batch specific laboratory duplicate or reagent water (blank) spike duplicate (of the compound or element of interest), expected value, percent recovery, calculated relative percent difference (RPD) and control limits;
- 3. Results of batch specific matrix spikes, expected value. percent recovery, control limits, and source;
- 4. Results of a laboratory control sample (LCS) or reagent water (blank) spike sample carried through the preparation method with the samples prior to analysis and analyzed along with the samples in the same analysis batch, expected value, percent recovery, and control limits;
- 5. Results of the associated initial calibration verification standard (ICVS) and all associated continuing calibration verification standard (CCVS) expected values percent recovery, and control limits.

Organics Analyses

Gas Chromatography (GC) Analysis

The results of the following analyses should be reported where applicable:

- Blanks
 - Water blanks (non-extraction)
 - Extraction blanks (laboratory blank)
 - Trip blanks

Note: Field blanks are treated as samples.

- Results of batch specific matrix spikes (if required to satisfy the method), expected value, percent recovery, and control limits;
- Results of batch specific laboratory duplicates or matrix spike duplicates, expected value, percent recoveries, relative percent difference (RPD), and control limits;

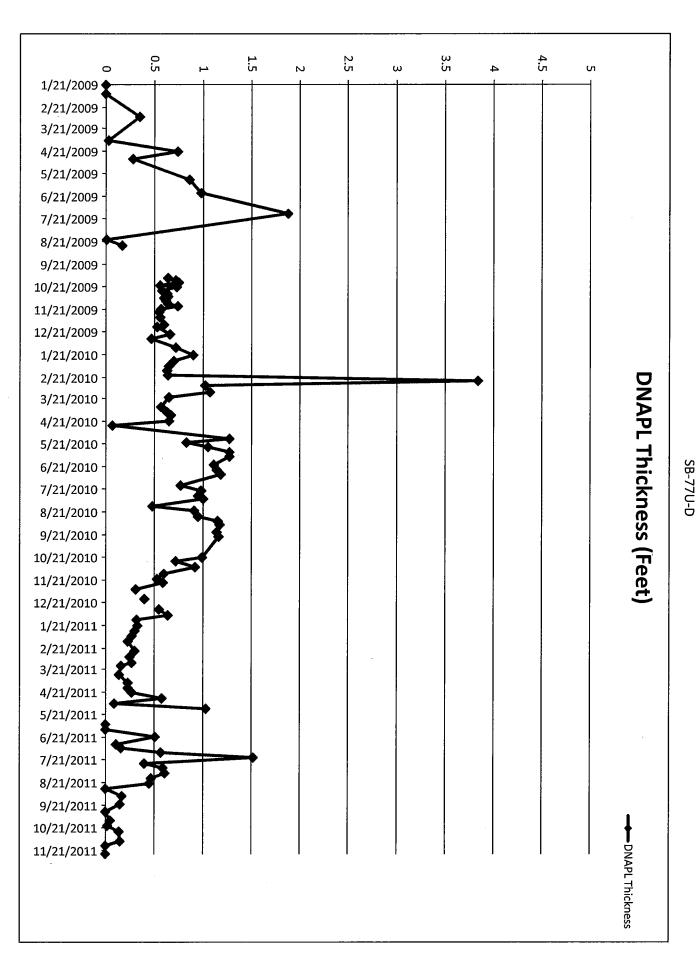
- Results of surrogate spikes, expected value, percent recovery, and control limits;
- Results of reagent water (blank) spikes and reagent water (blank) spike duplicate of compounds or elements of interest, expected value and percent recovery, calculated RPD and control limits. Reagent water (blank) spike duplicate is not required if laboratory duplicate or matrix spike duplicate is analyzed satisfactorily.

GC/Mass Spectrometer Analysis

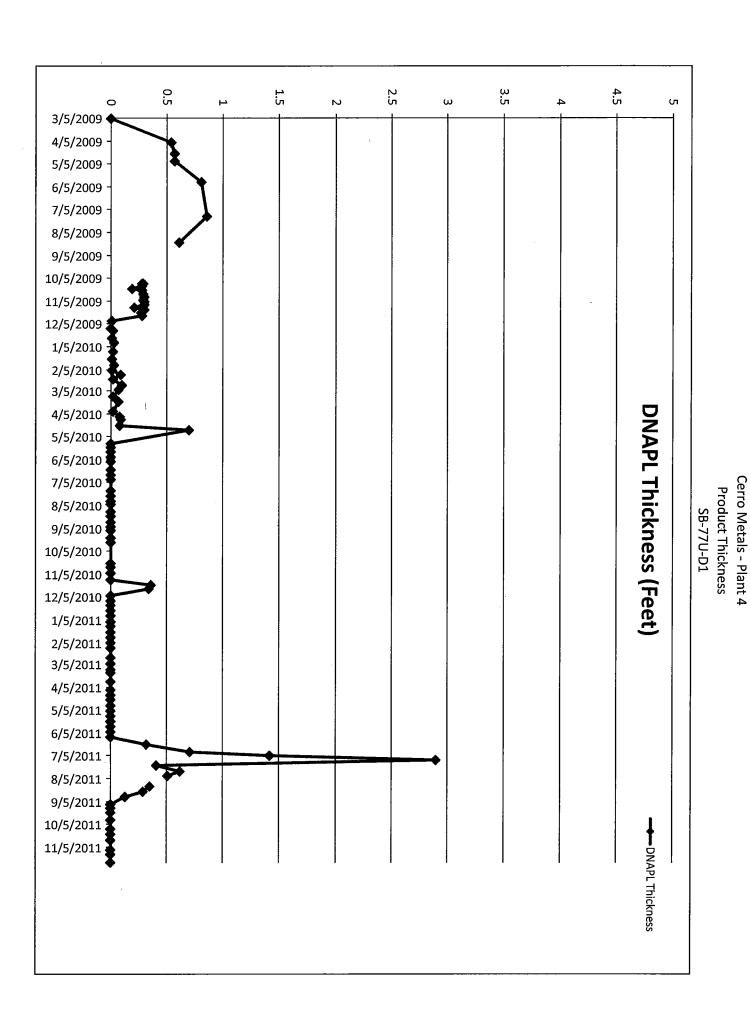
The results of the following analyses should be reported where applicable:

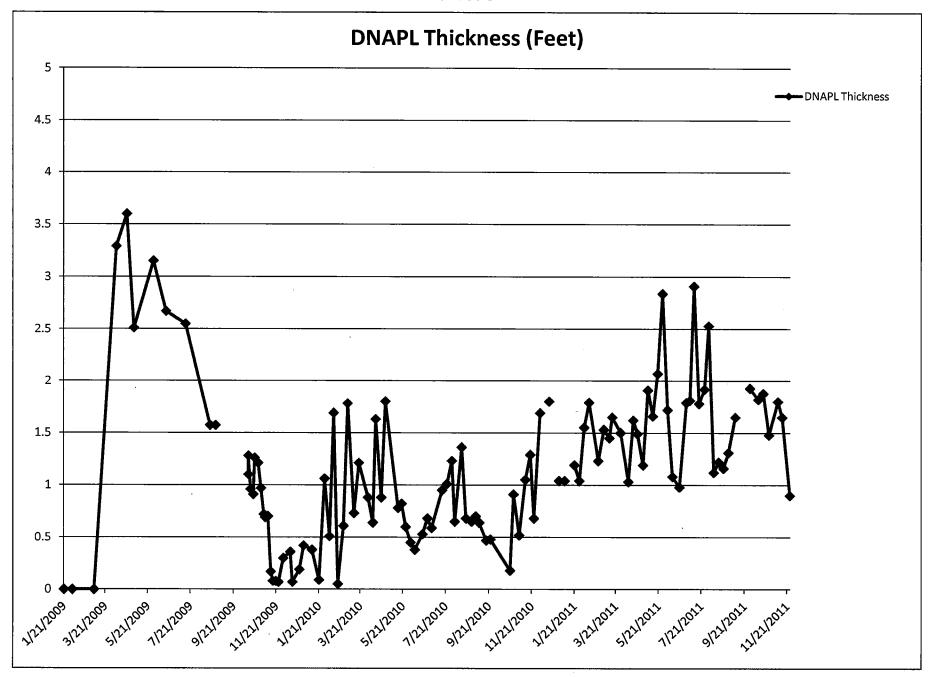
- Blanks
- Water blanks
- Extraction blanks
- Trip blanks
- Results of batch specific matrix spikes (as required by the method), expected recovery, percent recovery, control limits;
- Results of batch specific laboratory duplicates or matrix spike duplicates (as required by the method), expected recovery, percent recovery, calculated RPD, and control limits;
- Laboratory duplicates (optional)
- Surrogate spikes expected value, percent recovery, and control limits;
- Results of reagent water (blank) spikes and reagent water (blank) spike duplicate
 of compounds of interest (or matrix spiking compounds specific for the method),
 expected value, percent recovery, calculated RPD and control limits.

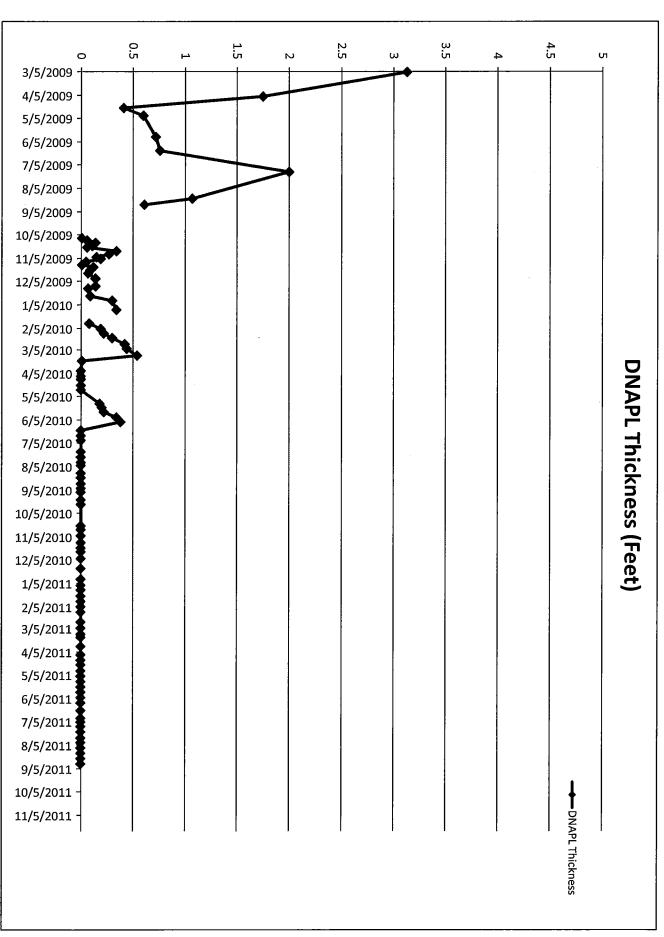
The following applies to both inorganic (metals and wet chemistry) and organic analyses, where applicable: If samples are digested, extracted or otherwise prepared together in a batch analyzed on different instruments or on the same instrument during different calibrations (e.g., on different days) then the laboratory is required to provide the stated deliverables for each analytical batch and for each instrument in the data package report. Included with this deliverable must be identification of which samples were analyzed under which quality control data and on which instrument. If the control samples are only periodically analyzed, then in addition to the stated deliverables the laboratory will be required to provide the initial and continuing calibration results of the other instruments used for each day samples were analyzed without control samples as appropriate for the analysis, regardless of the level of reporting.



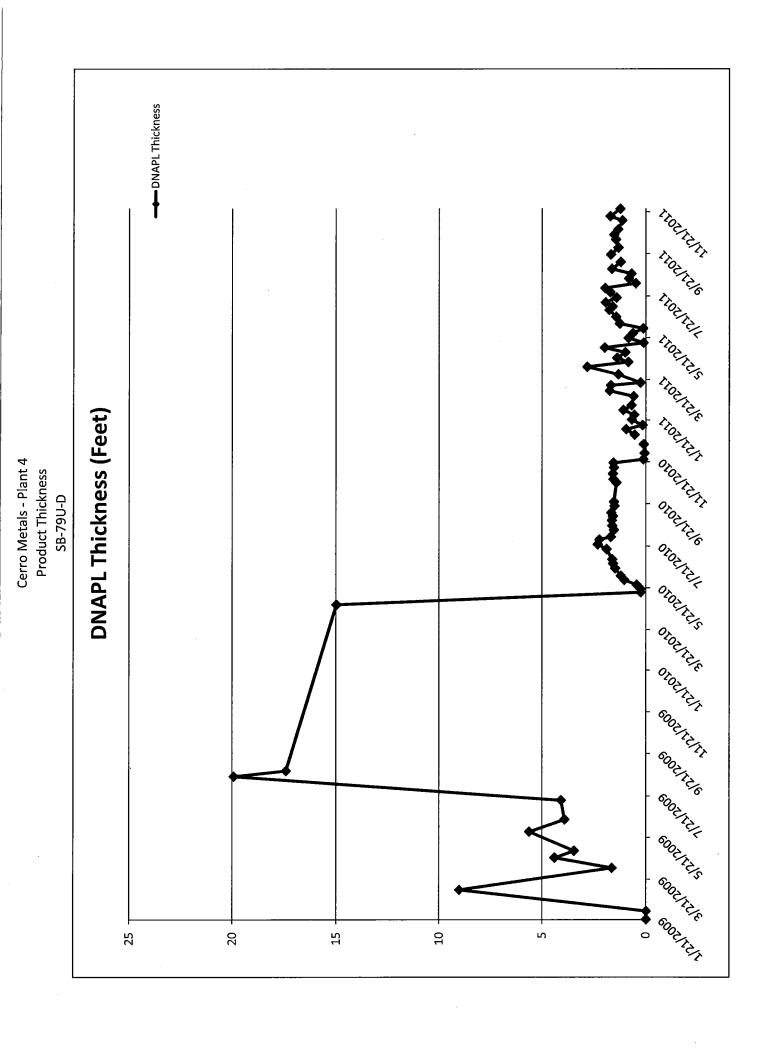
Cerro Metals - Plant 4
Product Thickness

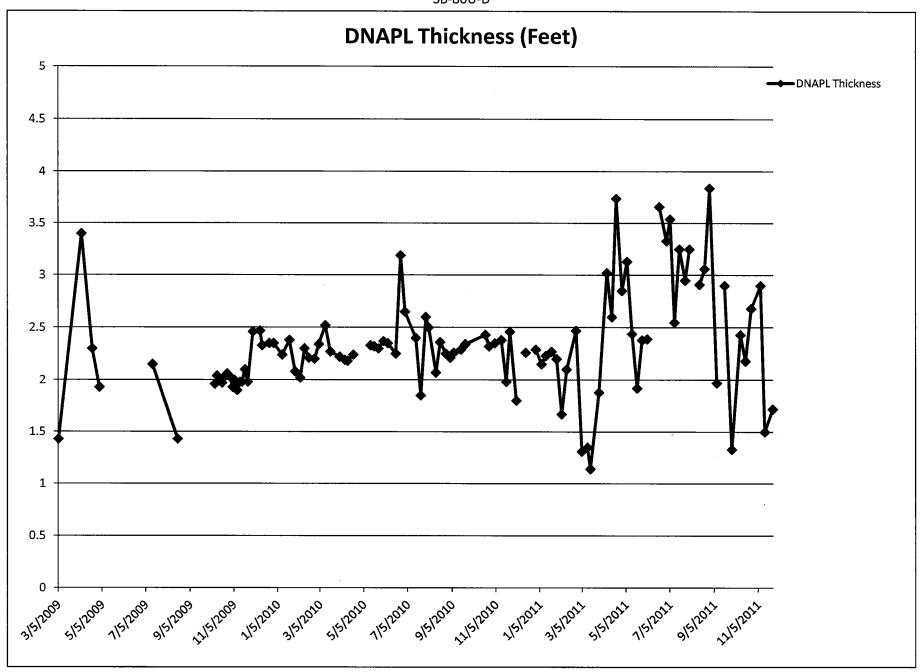


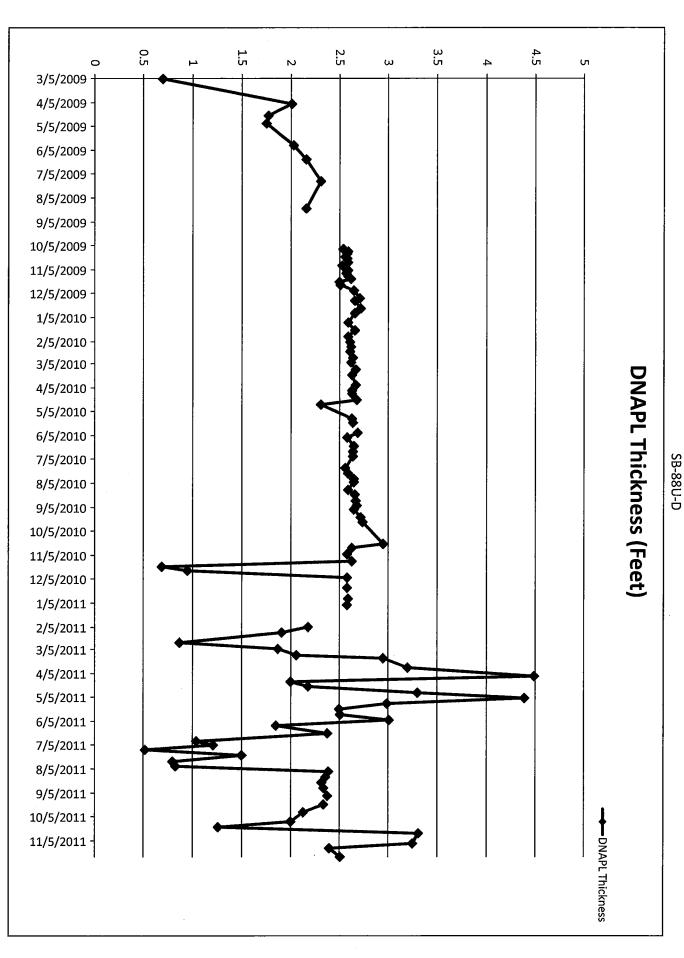




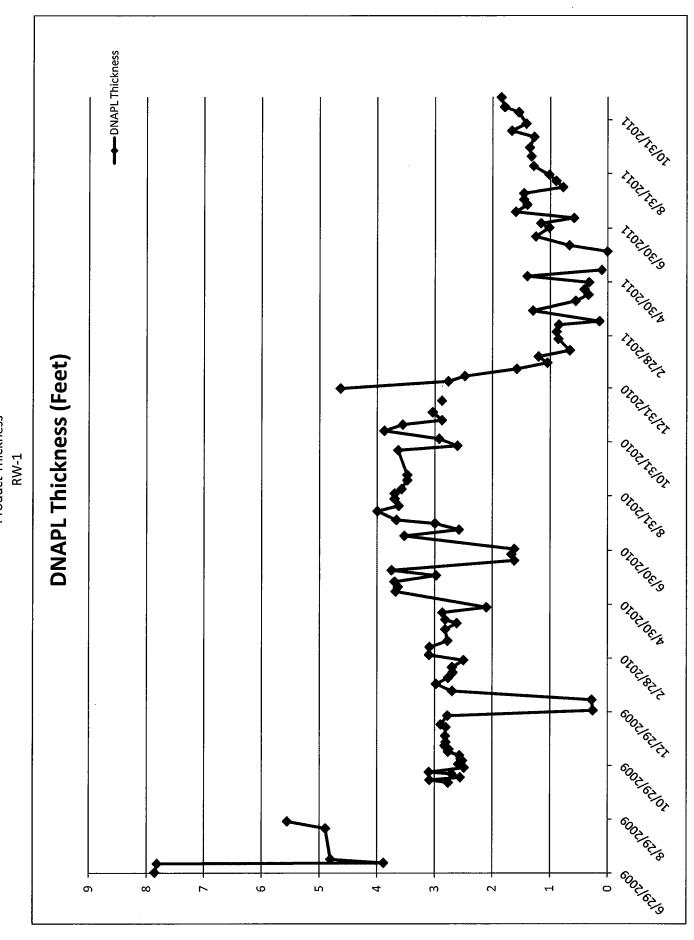
Cerro Metals - Plant 4
Thickness of Product
SB-78U-D1



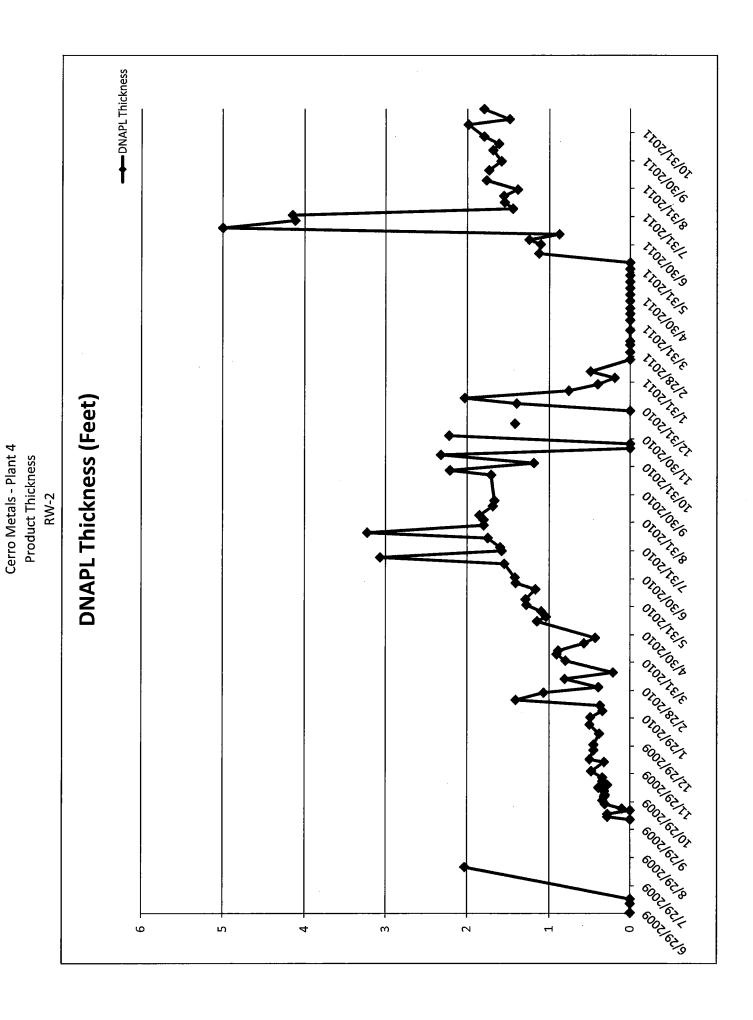




Cerro Metals - Plant 4
Product Thickness



Cerro Metals - Plant 4
Product Thickness
RW-1



Department of Natural Resources

Mann-Kendall Statistical Test Form 4400-215 (2/2001)

Remediation and Redevelopment Program

Notice: I his form is the DNR supplied spreadsheet referenced in Appendices A of Comm 46 and NR 746, Wis. Adm. Code. It is provided to consultants as an optional tool for groundwater contaminant trend analysis to support site closure requests under s. Comm 46.07, Comm 46.08, NR 746.07, NR 746.08, Wis. Adm. Code. Use this form or a manual method when seeking case closure under those rules. Earlier versions of this form should not be used.

Site Name :	Cerro - Plant 4			BRRTS No. =		Well Number =	SB-77U-D
	Compound ->	DNAPL	Thickness (ft)	- Maria Mari			
		Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event	Sampling Date	(leave blank	(leave blank	(leave blank	(leave blank		(leave blank
Number	(most recent last)	if no data)	if no data)	if no data)	if no data)	if no data)	if no data)
1	5-Mar-09	0.35					
2	26-Aug-09	0.17			_		
3	3-Mar-10	1.02					
4	1-Jun-10	1.27					
5	2-Sep-10	1.15					
6	3-Dec-10	0.31					
7	4-Mar-11	0.25					
8	3-Jun-11	0.01					
9	8-Sep-11	0.17					
10	25-Nov-11	0.01	er spenger er general de spenger en en general en egeneral en e				
!	Mann Kendall Statistic (S) =	-21.0	0.0		0.0		0.0
	Number of Rounds (n) =	10	0	-	0	0	0
:	Average =	0.47	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.483	#DIV/0!		#DIV/0!	#DIV/0!	
	Coefficient of Variation(CV)=	1.025	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
Error Check	, Blank if No Errors Detected		n<4	n<4	n<4	n<4	n<4
Trend ≥80°	% Confidence Level	DECREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥90	Trend ≥90% Confidence Level		n<4	n<4	n<4	n<4	n<4
Stability Tes	st, If No Trend Exists at		n<4	n<4	n<4	n<4	n<4
80% Confi	dence Level	NA	n<4	n<4	n<4	n<4	n<4
	Data Entry By =	M. Whitman	Date =	12.15.11	Checked By =	S. Treschow	

Department of Natural Resources

Mann-Kendall Statistical Test Form 4400-215 (2/2001)

Remediation and Redevelopment Program

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Site Name :	Site Name : Cerro - Plant 4				elledikki erremeti la sasta sikkariki. Bilir sili ilme 2000 tuli ilmen 122 uli.	Well Number = SB-78U-D	
	Compound ->	DNAPL	Thickness (ft)	AND THE PROPERTY AND THE PROPERTY OF THE PROPE	Be Fernand Breefen Andrew Arthur Arthur Arthur Arthur Bernand - Arthur Arth	300	AUX. III A MAINE III III III II II AAA AA AA AA AA AA AA
		Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event	Sampling Date	(leave blank	(leave blank	(leave blank	(leave blank	(leave blank	(leave blank
Number	(most recent last)	if no data)	if no data)	if no data)	if no data)	if no data)	if no data)
1	6-Apr-09	3.29					
2	14-Jul-09	1/2/1900					
3	3-Mar-10	1.78					
4	1-Jun-10	0.45					
5	2-Sep-10	0.7					
6	3-Dec-10	1.69					
7	4-Mar-11	1.53					
8	3-Jun-11	1.72					
9	8-Sep-11	1.65					
10	25-Nov-11	0.9			1.00		
	Mann Kendall Statistic (S) =	-17.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	0	0	0	0	0
	Average =	1.63	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.846	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.520	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check	, Blank if No Errors Detected		n<4	n<4	n<4	n<4	n<4
Trend ≥80°	% Confidence Level	DECREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥90	% Confidence Level	DECREASING	n<4	n<4	n<4	n<4	n<4
Stability Tes	et, If No Trend Exists at		n<4	n<4	n<4	n<4	n<4
80% Confi	dence Level	NA	n<4	n<4	n<4	n<4	n<4
	Data Entry By =	M. Whitman	Date =	12.15.11	Checked By =	S. Treschow	

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Site Name :	Cerro - Plant 4			BRRTS No. =		Well Number =	SB-79U-D
	Compound ->	DNAPL	Thickness (ft)	The state of the s	and the state of t		
		Concentration	Concentration	The state of the s	Concentration	Concentration	Concentration
Event	Sampling Date	(leave blank	(leave blank		(leave blank	(leave blank	(leave blank
Number	(most recent last)		if no data)	if no data)	if no data)	if no data)	if no data)
1	5-Mar-09	9.02					
2	18-Aug-09						
3	30-Apr-10						
4	10-Jun-10						
5	7-Sep-10						
6	3-Dec-10						
7	4-Mar-11	1.76					
8	3-Jun-11	0.14					
9	8-Sep-11	1.23					
10	25-Nov-11	ent, i recente de la compania de la	STREET, will be at a registration to the second of the sec	ess of the state of the state of	The Mark Color of the Section of the Color of the Section of the Color		
	Mann Kendall Statistic (S) =	-19.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =		0	0	0	0	0
	Average =	4.06	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
1	Standard Deviation =	6.181	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	1.523	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
American distance in the second section of the section of the second section of the second section of the section of the second section of the section	, Blank if No Errors Detected		n<4	n<4	n<4	n<4	n<4
	% Confidence Level	DECREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥90°	% Confidence Level	DECREASING	n<4	n<4	n<4	n<4	n<4
	st, If No Trend Exists at		n<4	n<4	n<4	n<4	n<4
80% Confi	dence Level	NA	n<4	n<4	n<4	n<4	n<4
	Data Entry By =	M. Whitman	Date =	12.15.11	Checked By =	S. Treschow	

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Site Name :	Cerro - Plant 4			BRRTS No. =	o Britania (1973) (Parisa Pro-rato de propinsi de distribución de describir de de la compania del compania del compania de la compania del la compania de la compania del la compania de la compania del la compania de la compania de la compania del la compania d	Well Number =	SB-80U-D
	Compound ->	DNAPL	Thickness (ft)	AND THE CHARLES WHEN THE STREET STREET OF COLUMN	ande de servicio ante de esta esta de entre de come en entre de esta de esta de esta de la come de la come de Esta de esta de la come de esta de la c	mogramma por tima de de ser en elemento qui e dividi de en circo e i con el circo e i con de displaya de prese	
		Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event	Sampling Date	(leave blank	(leave blank	(leave blank	(leave blank	(leave blank	(leave blank
Number	(most recent last)	if no data)	if no data)	if no data)	if no data)	if no data)	if no data)
1	5-Mar-09	1.43					
2	14-Jul-09	2.15					
3	3-Mar-10	2.34					
4	1-Jun-10	2.34					
5	2-Sep-10	2.21					
6	3-Dec-10	1.8					
7	4-Mar-11	1.31					
8	3-Jun-11	2.39				·	
9	8-Sep-11	1.97					
10	25-Nov-11	1.72	en de la companya de	and the same of th			
	Mann Kendall Statistic (S) =	-4.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	0	0	0	0	0
	Average =	1.97	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.389	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.198	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
a company of an applying only of a separate party	, Blank if No Errors Detected		n<4	n<4	n<4	n<4	n<4
Trend ≥80°	% Confidence Level	No Trend	n<4	n<4	n<4	n<4	n<4
e specificación e e a como terminatorio	% Confidence Level	No Trend	n<4	n<4	n<4	n<4	n<4
	t, If No Trend Exists at	CV <= 1	n<4	n<4	n<4	n<4	n<4
80% Confi	dence Level	STABLE	n<4	n<4	n<4	n<4	n<4
	Data Entry By =	M. Whitman	Date =	12.15.11	Checked By =	S. Treschow	

Department of Natural Resources

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Site Name :	Cerro - Plant 4		MAN, TEMPERATURE CONT. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	BRRTS No. =		Well Number =	SB-88U-D
	Compound ->	DNAPL	Thickness (ft)			and the state of t	The second secon
		Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event	Sampling Date	(leave blank	(leave blank	(leave blank	(leave blank	(leave blank	(leave blank
Number	(most recent last)	if no data)	if no data)	if no data)	if no data)	if no data)	if no data)
1	5-Mar-09	0.7					
2	14-Jul-09	2.31					
3	3-Mar-10	2.62					
4	1-Jun-10	2.69					
5	2-Sep-10	2.68					
6	3-Dec-10	2.58					·
7	4-Mar-11	1.87					
8	3-Jun-11	3.01					
9	8-Sep-11	2.38					
10	25-Nov-11	2.51	and the second s	. ,			
	Mann Kendall Statistic (S) =	7.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	0	0	0	0	0
	Average =	2.34	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
1	Standard Deviation =	0.647	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.277	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
A CONTRACTOR OF THE PROPERTY O	, Blank if No Errors Detected		n<4	n<4	n<4	n<4	n<4
	% Confidence Level	No Trend	n<4	n<4	n<4	n<4	n<4
even menomen or a non-color as a	% Confidence Level	No Trend	n<4	n<4	n<4	n<4	n<4
	Stability Test, If No Trend Exists at		n<4	n<4	n<4	n<4	n<4
80% Confi	dence Level	STABLE	n<4	n<4	n<4	n<4	n<4
	Data Entry By =	M. Whitman	Date =	12.15.11	Checked By =	S. Treschow	

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Site Name : Cerro - Plant 4				BRRTS No. =		Well Number = RW-1	
	Compound ->	DNAPL	Thickness (ft)	entere i terre / viol. (2 i v. 2 i i v. 4 i i i PP) e fichade columne a trabassa and b Danis propi (i i i	**************************************		
		Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event	Sampling Date	(leave blank	(leave blank	(leave blank	(leave blank	(leave blank	(leave blank
Number	(most recent last)	if no data)	if no data)	if no data)	if no data)	if no data)	if no data)
1	29-Jun-09	7.86					
2	26-Aug-09						
3	3-Mar-10	3.1			: 		
4	1-Jun-10	2.98					
5	2-Sep-10	3.7					
6	3-Dec-10	3.04					
7	4-Mar-11	0.89					
8	3-Jun-11	0.01					
9	8-Sep-11	1.29					
10	25-Nov-11	1.85	tronate in the transfer	2			
	Mann Kendall Statistic (S) =	-29.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	10	0	0	. 0	0	0
	Average =	3.03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	2.317	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.765	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥80% Confidence Level		DECREASING	n<4	n<4	n<4	n<4	n<4
Trend ≥90% Confidence Level		DECREASING	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at			n<4	n<4	n<4	n<4	n<4
80% Confidence Level		NA	n<4	n<4	n<4	n<4	n<4
<u> </u>	Data Entry By =	M. Whitman	Date =	12.15.11	Checked By =	S. Treschow	

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Site Name : Cerro - Plant 4				BRRTS No. =		Well Number = RW-2	
	Compound ->	DNAPL	Thickness (ft)	A STATE OF THE PARTY OF THE PAR	The state of the s	A Company of the Comp	Make and angle 15. all as a constant of section as again to profession by
		Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
Event	Sampling Date	(leave blank	(leave blank	(leave blank	(leave blank		(leave blank
Number	(most recent last)	if no data)	if no data)	if no data)	if no data)	if no data)	if no data)
1	29-Jun-09		=				
2	18-Aug-09	2.03					
3	3-Mar-10	0.39					
4	1-Jun-10	1.28				: .	
5	2-Sep-10	1.8					
6	3-Dec-10	2.22					
7	4-Mar-11						
8	3-Jun-11					_ :	
9	8-Sep-11	1.77					- :
10	25-Nov-11	1.8	and the second s	and the second second			
	Mann Kendall Statistic (S) =	4.0	0.0	0.0	0.0	0.0	0.0
	Number of Rounds (n) =	7	0	0	0	. 0	0
	Average =	1.61	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Standard Deviation =	0.611	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Coefficient of Variation(CV)=	0.379	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Error Check, Blank if No Errors Detected			n<4	n<4	n<4	n<4	n<4
Trend ≥80% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Trend ≥90% Confidence Level		No Trend	n<4	n<4	n<4	n<4	n<4
Stability Test, If No Trend Exists at		CV <= 1	n<4	n<4	n<4	n<4	n<4
80% Confidence Level		STABLE	n<4	n<4	n<4	n<4	n<4
Data Entry By =		M. Whitman	Date =	12.15.11	Checked By =	S. Treschow	